THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade has gone one week into the new year without any notable signs of activity, but the feeling is hopeful in all lines. A belief that traffic and coke troubles will work toward a better state, and that production of pig iron and steel will be increased as the year advances, has inspired an expectation that prices in certain lines will work lower. Some of the inquiries that have gone in to manufacturers in the past week are evidently to locate those who are ready to make concessions. Thus far they have not appeared, but meantime there is no general buying. The banking of furnaces because coke cannot be had continues. Several in the Chicago district were forced to quit in the past week, especially affecting the supply of malleable pig iron, while a number of steel corporation furnaces in the Central West were temporarily idle. A large tonnage of due but undelivered pig iron goes over into the new year and stands as a block to any early recession of prices. Increased freights and higher coke prices, with a possibility of a slight advance on some ores for 1903, are among the forces working against a lower level for pig iron. In the East import pig iron and the evident willingness of foreign makers to make further reductions to hold their American trade, are to be reckoned with by sellers of domestic iron for some months. Contracts for the second half are of little interest meantime to buyers of foundry iron, most of whom are evidently content to piece out for the first half as they need the iron. The substantial fact here is that the foundries are fully employed and see no signs of any slacking. The size of the unprovided needs of foundries in the next six months is the unknown factor that will determine whether the expected buying movement is to come this month. It is known that consumers of gray forge are not well bought ahead, and the market has grown rather firmer while they have waited. Southern furnaces ask $19 for No. 2 as minimum for early deliveries, and $20 is still common, while on deliveries in the first half the range is from $18.50 to $19. The argument of increased supply of iron with additional furnace capacity active in the second half of the year strengthens the waiting attitude of buyers on late deliveries. The steel situation as gauged by Pittsburg conditions is not encouraging to buyers of billets and sheet bars. Foreign and domestic prices are both too high to warrant present purchases for small finishing mills. Some of the independent sheet mills are discussing consolidation and canvassing the feasibility of buying ore and coal properties and building furnaces and steel plant. The proposal involves the investments of millions to protect one of tens of thousands. Other mill companies are still disposed to hold their position, finding a margin, though a small one, under present conditions. The bar situation is closely watched by buyer and seller. Steel bars have been well bought in the Chicago district, as compared with preceding weeks, and in the Central West there is considerable inquiry, with large consumers pressing for a differential between their long time contracts and the purchases of smaller interests. Structural material has been quieter than for some weeks. In New York the Wanamaker building, with its 16,000 tons of steel, is one of the largest prospects of construction firms. January opened with an advance of $1 a ton on wire and wire nails, a first fruit of the recent consolidation of wire interests, and at the same time a legitimate result of strong demand throughout the wire industry. Increased freights are already operative, and Southern freight committees are discussing a further advance of 50 cents on all pig iron shipments.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, JAN. 7.

Large consumers of billets, pig iron and steel bars who have made inquiries in the past ten days to cover requirements for the next three to six months, have not yet placed their orders, evidently believing that by holding off concessions will be made. The producers have shown no signs of weakening, and it is said no concessions will be made from present quotations. A meeting of the steel bar manufacturers was held several days ago to consider the demands of the large consumers for a concession of $2 per ton on long time contracts, but after careful consideration it was decided that this should not be made, owing to the already low ruling price of bars in comparison with the cost of raw material. Some of the steel bar manufacturers are of the opinion that some concession should be made the large buyer, and are in favor of slightly advancing quotations to the buyer of small lots. No official action has yet been taken.

Independent sheet and tin plate manufacturers are eager to purchase steel, but not at present prices, and many of the mills will continue inoperative until better prices prevail. The German steel market has again advanced slightly and small billets and sheet bars cannot be delivered in this district less than $21 per ton, a prohibitive price to sheet and tin plate manufacturers who are compelled to meet the quotations of the American Tin Plate Co. and the American Sheet Steel Co. It is believed that the meeting of the independent manufacturers held in this city last week may ultimately lead to a consolidation of some of the independent sheet and tin plate mills. Before an attempt at consolidation is made the prospect of securing ore, coal and coking properties will be carefully looked into by a committee appointed at the recent meeting and now carrying on this investigation. Should the committee report favorably steps will be immediately taken to form a consolidation and funds will be raised to purchase raw material properties and furnaces and a steel plant will be erected to furnish steel to the finishing mills.

On Jan. 2 the leading wire and wire nail interests announced a straight advance in prices of $1 a ton on all products. All the large buyers availed themselves of the opportunity of closing for their requirements at the reduced prices announced on Oct. 1, and the bulk of the tonnage that will be shipped from the mills for the next two or three months will be on the basis prevailing previous to the late advance. All of the large interests are in accord on this advance.

Yesterday a number of the leading officials and presidents of the constituent companies of the United States Steel Corporation visited the plant of the Sharon Steel Co., at Sharon, Pa., with a view of deciding upon some policy of disposing of the finished material without the necessity of continuing a separate sales department for the products of this plant. Owing to the different lines of finished material produced the situation is decidedly complex. With reference to the products of the Union Steel Co., it is reported on excellent authority that they will be disposed of by the American Steel & Wire Co. The latter could not dispose of the products of the Sharon Steel Co. owing to the production of sheets, tin plate and pipe at this plant. A selling arrangement will be decided on

shortly as a result of this visit. Whether the pipe plant will be operated at all is a question now being seriously considered. It is reported that its operation with open-hearth steel would not be as economical as desired, while the shipment of Bessemer steel to this plant would further add to the cost of production. The skelp mill will undoubtedly operate on small sizes of plates, materially adding to the corporation's plate capacity, which is too small at present to meet the demands. The operation of the sheet plant is assured, however, while the other two units, the tin plate mill and wire and wire nail plant, will also be continued in operation.

PIG IRON.—There has been little buying during the week, although large purchases of both basic and Bessemer will shortly be made by large independent interests. The market does not seem to have weakened to any extent, and quotations are practically the same as last week. With reference to the prospect of large purchases of Bessemer iron by the United States Steel Corporation, it is stated that it is altogether probable that little or no further iron will be taken from the merchant furnaces. One furnace at Rankin and one at Braddock will be blown in shortly, while the No. 4 stack at Youngstown, O., is also scheduled for early operations. Two stacks at Donora and one at Sharon will also be available about the middle of the year, which will increase the corporation's output several hundred thousand tons over the annual purchase from the merchant furnaces. The last shipments on iron already purchased cannot possibly be made before May and meantime the corporation's pig iron output will be increased fully 500,000 tons annually. The market on forge iron is growing somewhat firmer, due largely to the better operation of the Valley furnaces, curtailing the production of off iron which was offered in the market. Bessemer iron for deliveries running to July 1 is held firmly at $21 at the furnace, or $21.85, Pittsburg, while for the first quarter $21.50 to $21.75 is asked at the furnace. We revise quotations as follows:

Bessemer, Valley	$21 00 to 21 75
Bessemer, Pittsburg	21 85 to 22 60
No. 1 Foundry	24 00 to 24 50
No. 2 Foundry	23 00 to 23 50
Gray Forge, Pittsburg	20 75 to 21 00
Chilled Basic, Valley	21 00 to 21 50
Chilled Basic, Pittsburg	21 85 to 22 35

STEEL.—The market continues quiet, although there is heavy inquiry for billets, sheet and tin bars. Bessemer billets are held at $29 to $30, and sheet bars at $33. Open-hearth billets are quoted at $31, Pittsburg, for ordinary specifications and sizes, while special sizes and high carbons are as high as $37. German billets are $31, Pittsburg, but this price is too high to interest consumers.

FERRO-MANGANESE.—English manganese continues to be offered in this market at $49 to $50 per ton in 50-ton lots and over, delivered at buyer's mill. Less than 50-ton lots are held at $55.

SPELTER.—Prime Western grades are held at 4.58½c to 4.60c, Pittsburg, in carload lots.

MUCK BAR.—The market is growing stronger and we note the sale of 4,000 tons for delivery during the next two months at $34. Inquiries are numerous and the indications point to a heavy buying movement in the near future.

SKELP.—The smaller sizes of iron skelp are commanding high prices, 2.15c having been paid during the last few days for a small lot. Larger sizes of iron skelp are held at 1.90c, while steel skelp is held at 1.92½c.

RAILS AND TRACK MATERIAL.—Little new business has been placed in rails during the week, while the demand for light rails has also fallen off to some extent. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $43; 12 pounds, $42; 16 pounds, $40; 20 pounds, $39; 25 to 40 pounds, $37 to $38. Track materials: Spikes, 2.15c to 2.25c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c.

PLATES.—New business in plates continues good and several large orders are now pending. Quotations are unchanged as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.75c; marine, ordinary, fire-box, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive fire-box, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

BARS.—Consumers of steel bars are holding off, believing that slight concessions will be made on long time contracts. At a meeting of the steel bar manufacturers last week it was decided to ask 1.60c on all orders, although it is probable that on small orders a slight advance will be made. On iron bars the large producers generally hold to 1.80c, though on shipments west of Pittsburg delivered prices are reported at not less than 1.80c, Pittsburg. We quote as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c, Pittsburg, with freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

STRUCTURAL MATERIAL.—The amount of new business that is being placed is not heavy, which is a relief to nearly all the mills, enabling them to catch up on some of their back orders. Agreement quotations are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—The amount of new business that is being closed is fair considering the season of the year. Owing to the scarcity and high price of the smaller sizes of skelp some of the independent mills are finding the merchant pipe business exceedingly unprofitable at ruling quotations. Prices on carload lots, plus the freight to destination, are as follows:

MERCHANT PIPE.

	Steel		Guaranteed Wrought Iron	
	Black Percent.	Galv. Percent.	Black Percent.	Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	73	63	70	60
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	69	57	66	54
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	70	58	66	55
Extra Strong Plain End				
⅛ to 8 inch	69	59	65	55

Threads only—Same as Plain End, plus 1¼ percent net.
Threads and Couplings—Same as Plain End, plus 2½ percent net.

Double Extra Strong Plain End				
½ to 8 inch	61	51	57	47

Threads only—Same as Plain End, plus 2 percent net.
Threads and Couplings—Same as Plain End, plus 3 percent net.

NOTE: Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1¼ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1¼ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	63

SHEETS.—The demand for sheets is much better than for some time and there has been considerable buying since the first of the year. The tin plate trade can be said to be at a normal condition, as less than 25 percent of the mills of the American Tin Plate Co. are now idle. Black sheets in 500 bundle lots and over are quoted as follows: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.60c; No. 18, 2.85c; No. 26, 3.35c; No. 27, 3.60c; No. 28, 3.85c; No. 29, 4.35c; No. 30, 4.50c.

WIRE AND WIRE NAILS.—A straight advance of $1 a ton on all wire products was announced on Jan. 2. Base prices apply to carload purchases by large jobbers exclusively, while the

smaller jobbers pay the same advance asked retailers. We revise quotations as follows: Wire nails, carload lots, to jobbers f. o. b. cars, Pittsburg, $1.90; plain wire, carload lots, $1.80; barb wire, carload lots, $2.20; staples, carload lots, $2.10. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Cut nails are quoted as follows: Carload lots, $2.05, and less than carload lots, $2.10 f. o. b. Pittsburg, plus freight to point of destination. Terms, 60 days, less 2 percent off in 10 days.

MERCHANT STEEL.—The volume of business in some of the finer grades of steel is not as heavy as it was a few weeks ago, but large consumers are expected to close contracts for future deliveries shortly, a number of inquiries being already in. Slight concessions are being made on shafting by some of the smaller mills and it is altogether probable that at the next meeting of the shafting manufacturers quotations will be revised. We make the following quotations: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

OLD MATERIAL.—There has been considerable buying of cast scrap in this market by foundries in this district at prices ranging from $17 to $17.50 per gross ton. The market generally is quiet, however. We quote gross tons as follows: Heavy melting stock, $22 to $22.50; low phosphorus melting stock, $24 to $24.50; steel rails, $21 to $21.25; re-rolling rails, $22 to $22.50; No. 1 cast scrap, $17 to $17.50; borings and turnings $11 to $11.50; busheling scrap, $16 to $16.50; old iron rails, $24.50 to $25.

COKE.—There is little change in the coke situation, high prices continuing to rule for prompt shipments. High prices for coal for Eastern shipment are being offered and large tonnages have been disposed of during the past few days at prices ranging from $5 to $5.50 at the mines. The coal companies are experiencing much trouble in securing cars from the railroads for Eastern shipment and this action on the part of the railroads has much to do with the high prices paid for the coal. Could the coal operators secure all the cars required there would be an immediate reduction in price. For the week ending Saturday, Dec. 27, the production of the upper Connellsville region amounted to 212,080 tons, as compared with 228,668 tons the previous week. The production of the lower region amounted to 41,120 tons, a falling off of about 7,000 tons over the production of the previous week.

CHICAGO.

OFFICE OF *The Iron Trade Review*.
519 MONADNOCK BLOCK, Jan. 6.

The condition of the local market may be summed up in one sentence. It is firm but quiet. Inquiry for pig iron in the first week of the year has not been as heavy as was anticipated, which is due largely to the fact that last month, Southern furnaces made a substantial improvement in their shipments of contract iron. In finished lines, there is a good demand for merchant pipe, steel bars, light sheets and merchant steel. The aggregate of the sales of steel bars this month is already greater than the total tonnage booked in December, the figures of which month were greater than for several months preceding. The bulk of the buying is from implement sources, the same interests being responsible also for the activity in merchant steel. The heavy demand for the latter, which has kept up all winter, is illustrated in the case of a leading producer, whose shipments into this territory during December were greater than for any other month in the company's history. The demand for sheets comes principally from manufacturers of electrical machinery, while the brisk movement in merchant pipe is attributable to the open weather and the low stocks in the hands of jobbers.

Southern furnaces are still suffering from a scarcity of cars, and have accumulated in their yards stocks aggregating 50,000 tons, all of which is badly needed on contracts. Other interests in the South are suffering from the railroad embargo, the leading producer of cast iron pipe being two or three months behind in its shipments. Local furnaces feel keenly the scarcity of rolling stock in their inability to get fuel, and are forced to depend on the day's receipts of coke to keep in blast. Few if any are catching up on delayed shipments, and are taking on little new business. An advance of $5 a ton on wire products was put into effect by the leading interest Dec. 31. The cost of sheets, steel bars, angles and hoops has also been increased 30 cents a ton as a result of the advance in freight rates of this amount from Pittsburg to Chicago, which became effective Jan. 1. The 20 cent advance in the freight rate on pig iron from the Ohio River to Chicago also went into effect the first day of the year.

PIG IRON.—Foundrymen have not shown any evidence of that haste to place contracts for the ensuing six months which sellers expected with the coming in of the new year. Instead, the buying has been of a desultory nature, and the total tonnage placed is not of large proportions. The majority of the orders are for less than 500 tons, though one Southern furnace reports having booked two contracts of 1,500 tons and 1,000 tons respectively, all for foundry iron, shipments running through the first half of the year. Sellers are of an optimistic turn of mind, and believe it is only a question of a few days ere the buying movement takes on a decided impetus. A large number of foundries have not yet covered for their wants for any portion of this year, and while many of them have managed to accumulate small stocks in their yards, due to the improvement in Southern shipments in the past month, these cannot last very long. Prices are strong at $18.50 to $19 Birmingham for No. 2 foundry for forward deliveries an $20 for quick shipment. There is no improvement in the condition of local furnaces as regards the fuel situation, the meager shipments of coke greatly curtailing the production of pig iron in this section. Malleable iron foundries are the chief sufferers from this condition of affairs, several local stacks, now banked, producing malleable pig iron when in blast. Shipments from furnaces have been very irregular for some time past, and malleable pig for spot delivery has been and continues in active demand. The car scarcity in the South shows slight improvement, and furnaces report stocks of over 50,000 tons in their yards as a result. We quote for delivery in the first half as follows:

Lake Superior Charcoal	$25 00 to 26 00
Local Coke Foundry No. 1	24 50 to 25 00
Local Coke Foundry No. 2	24 00 to 24 50
Local Coke Foundry No. 3	23 50 to 24 00
Local Scotch Foundry No. 1	25 00 to 25 50
Local Scotch Foundry No. 2	24 50 to 25 00
Southern Coke No. 1	23 85 to 24 35
Southern Coke No. 2	23 35 to 23 85
Southern Coke No. 3	22 85 to 23 35
Southern Coke No. 4	22 35 to 22 55
Southern No. 1 soft	23 85 to 24 35
Southern No. 2 soft	23 35 to 23 85
Southern Gray Forge	22 35 to 22 85
Southern Silveries	26 85 to 27 35
Jackson Co. Silveries	31 00 to 32 00
Ohio Strong Softeners	26 10 to 27 10
Alabama Car Wheel	27 35 to 27 85
Malleable Bessemer	24 50 to 25 00
Standard Bessemer	24 00 to 25 00

BARS.—The buying of steel bars has been very heavy in the past week, a leading manufacturer reporting that its sales this month already exceed the total tonnage sold during December. The specifications have also been large, coming in for lots as high as 2,000 tons. Bar iron shows no change. New business is not of large proportions but specifications are good. Hoops and angles are strong, in sympathy with bars. The advance in freight rates of 30 cents a ton from Pittsburg to Chicago has increased the cost of steel that amount. We quote mill shipments, Chicago delivery, Bessemer steel, 1.76½c to 1.81½c; angles, less than 3x3, 1.86½c to 1.90½c base; hoops, 2.16½c; iron, 1.75c to 1.80c. Prices on lots from store, steel, 2c to 2.10c; iron, 2.15c to 2.20c; hoops 2.40c to 2.50c; angles, 2.25c to 2.50c rates.

SHEETS.—Light sheets for electrical purposes have been in good demand during the week under review. Other departments are quiet. We quote No. 27 black, 2.70c to 2.75c; galvanized, 3.35c to 3.45c; for deliveries from stock,

No. 27 black, 2.95c to 3c; galvanized 75 percent to 75 and 5 percent.

STRUCTURAL STEEL.—There is a good demand from store for all sizes and shapes, though mill orders have not been numerous. We quote mill prices Chicago delivery for beams, 15 inches and under, 1.75c to 2c; 18 inches and over, 1.85c to 2.10c; universal plates, 1.75c to 2c; angles, channels and tees, 1.85c to 2c base. The maximum quotation represents the price for quick delivery. On lots from store cut to length we quote 2¼ to 2½ cents per pound.

BILLETS.—Local importers report sales for Eastern delivery of 200 tons of foreign nail slabs and billets. The advance in ocean and railroad freight rates has increased the cost of the foreign product. We quote domestic open-hearth billets for forging purposes, $37 to $40, according to tonnage and point of delivery; for use in rolling mills, $33.50 to $34. German basic bessemer billets are offered at $28 to $29, seaboard, duty paid, for round lots—5,000 tons and upwards—of one size and one carbon. Special carbons can be had abroad, but bring higher prices according to specifications and quantity.

RAILS AND TRACK SUPPLIES.—Mills continue to receive inquiries for standard sections in lots of 2,000 tons and upwards, but owing to the late deliveries which are all that can be promised, few of these develop into orders. There is a good demand for track supplies and light rails, and manufacturers report they are filling up rapidly. We quote standard sections, $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes. Track supplies, mill shipments, are quoted as follows: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c; second quality, 2.15c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.15c, with usual differentials for other sizes.

MERCHANT STEEL.—Specifications are very heavy, though new business is limited owing to the crowded condition of mills. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 to 10 percent higher; cold rolled shafting, carload lots, 47 percent off, Chicago; less than carload lots, 42 percent off, Chicago.

MERCHANT PIPE AND BOILER TUBES.—There is no diminution in the demand for merchant pipe, buying continuing to be of large proportions. Boiler tubes are active from stock, mills being considerably delayed in shipments. We quote f. o. b. Chicago.

MERCHANT PIPE, RANDOM LENGTHS.

	Black. Percent.	Galv. Percent.
⅛ to ¾ in., inclusive	66½ net	56½ net
16 in.	68½ net	58½ net
¾ to 6 in., inclusive	73½ net	63½ net
7 to 12 in., inclusive	71½ net	61½ net

BOILER TUBES.

Steel.

	Percent.
1 to 1½ in.	43½
1¾ to 2½ in.	56
2¾ to 5 in.	61
6 to 13 in.	56

Iron.

	Percent.
1 to 1½ in.	38
1¾ to 2½ in.	36
2¾ to 5 in.	46
6 inches and larger	36

CAST IRON PIPE.—Aside from the usual run of small orders, there is little of interest to report. The leading producer is suffering from a scarcity of cars at its Southern plants, and large stocks have been accumulated. We quote f. o. b. Chicago, 4-inch water pipe, $36; 5-inch, $35; 8-inch and upwards, $34; gas pipe, $1 a ton higher.

PLATES.—Jobbers report an active demand, the crowded condition of mills deflecting considerable tonnage to these sources. We quote mill shipments, Chicago delivery: tank steel, ¼ inch and heavier, 1.75c to 2c base; flange steel, 1.85c to 2.10c. Price from stock, tank steel, ¼ inch and heavier, 2.25c to 2.35c; 3-16, 2.35c to 2.40c; No. 8, 2.40c to 2.50c; flange steel, 2.50c to 2.60c.

WIRE PRODUCTS.—The leading local manufacturer announces an advance on all products of $5 a ton, effective since Dec. 31. Buying continues to be a heavy proportions, the demand including all materials. We quote prices to jobbers, carload lots, Chicago delivery, as follows: Smooth wire annealed, 1.95c; galvanized, 2.25c; painted barb wire, 2.35c; wire nails, 2.05c; cut nails, 2.15c; polished staples, 2.20c; galvanized staples, 2.50c. Prices to retailers are 5 cents higher than above quotations on carload orders, and 15 cents higher on less than carload lots.

COKE.—There is no improvement in the local situation, and receipts of coke in this city are far below requirements. For coke on track, $9 to $10 is asked, and for forward deliveries, $5 to $5.25 at the ovens.

OLD MATERIAL.—The local market is featureless, buying being of very small proportions. The following are selling prices per gross ton:

Old Iron Rails	$24 00 to 24 50
Old Steel Rails (mixed lengths)	18 00 to 18 50
Old Steel Rails (long lengths)	23 00 to 23 50
Relaying rails	31 50 to 32 00
Old wheels	22 50 to 23 00
Heavy melting steel	16 50 to 17 00
Mixed country steel	15 00 to 15 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$19 00 to 19 50
No. 2 R. R. wrought	17 50 to 18 00
Shafting	19 50 to 20 00
Dealers' forge	16 00 to 16 50
No. 1 busheling	13 50 to 14 00
No. 1 Cast	16 50 to 17 00
Railway malleable	15 50 to 16 00
Country malleable	14 50 to 15 00
Iron axles	23 50 to 24 00
Steel axles	19 50 to 20 00
Cast borings	10 00 to 10 50
Wrought turnings	13 50 to 14 00
Iron axle turnings	14 00 to 14 50
Steel axle turnings	13 00 to 13 50
Stove plates	12 50 to 13 00
Old iron splice bars	21 00 to 21 50

A. M. Crane & Co., Inc., Chicago and New York, have opened a pig iron, coal and coke department and have arranged with C. E. Louis, of Chicago, to take charge of it. Mr. Louis has had long experience in the sale of these products having been connected with Forster, Hawes & Co., Rogers, Brown & Co., Domhoff & Joyce Co. and Hickman, Williams & Co.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Jan. 7

The general situation is one of pronounced dullness. This is undoubtedly due in large measure to the fact that business is always slow in resuming after the holidays, but it is nevertheless true that the attitude of buyers is somewhat disappointing. Many seem to be of the opinion that prices will be lower though there are no definite developments upon which to base such a conclusion as applied to the immediate future.

IRON ORE.—There has been some informal discussion and talk of formal conference by representatives of Bessemer ore interests, but nothing definite has been done. The feeling still prevails that unless the United States Steel Corporation's influence should prevent prices will be slightly higher. It is possible that an effort will be made again to get some agreement on non-Bessemer ores and Mesabi ores. Inquiry develops that while the larger producers of pig iron are well supplied with ore, many of the smaller companies will draw from ore on docks to a considerable extent before May 1. Shippers of grain and coal have been negotiating for vessels for next season, but nothing is being done by ore shippers. It is the expectation in some quarters that on account of the increased cost of coal and labor, which will raise the cost of running vessels, freights will be higher than last year.

COKE.—Delivery of coke has been very slow this week. While $8 is the usual price for spot, as high as $9 has been paid for foundry coke, and $5.25 is still the prevailing price for the first half. Buyers are looking forward hopefully to new oven construction to reduce the price for the second half. A num-

ber of furnaces are banked on account of not being able to get coke, including several stacks of the National Steel Co.

PIG IRON.—There have been few inquiries and sales have been in smaller volume than for several weeks. Spot iron is on a basis of $24.75 for No. 1 Northern, but it is probable that a little better than this could be done. Prompt No. 2 Southern has been advanced from $24.20 to $24.35, Cleveland, on account of freight rates from the Ohio River being raised 15 cents. For the first half for Southern No. 2, $23.35, Cleveland, is the price. Some off basic has come into the market as gray forge and is quoted about $20.50 at furnace. For the latter half, there seems to be no interest. Inquiries are seldom heard of and no sales are reported. For this period the prices are nominally on a basis of $22.75, Cleveland, for No. 1 foundry and $21.75 for No. 2. We quote domestic irons as follows, f. o. b. Cleveland, for shipments in the first half of 1903:

Bessemer	$21 75 to 22 25
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	23 00 to 23 50
Scotch No. 2	22 50 to 23 00
Gray Forge, Valley	20 25 to 20 50
Lake Superior Charcoal	27 50 to 28 00

FINISHED MATERIAL.—The tone of the market is healthy, but very little business is being done. Salesmen have not as a rule started to see their customers on regular trips, but are sent out when promising inquiries come in. Bar iron seems to be a little stronger, sales having been made at 1.75c, Pittsburg, for common, but on the other hand consumers have declined to purchase at that price, claiming that they could do better, and have postponed placing their orders. Plates continue the strongest feature. A Cleveland customer who is having work in which plates are used done at Pittsburg paid 2c at Coatesville, Pa., through a Cleveland agent, for plates to be shipped to Pittsburg, and this is not an exceptional order. Steel bars are held at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg, but few sales are being made. Structural material is a little easier. This is especially true of angles, which can now be had within reasonable time without premium. Conditions as to sheets remain unchanged. The price of the distributors of the product of the principal producer, are as follows: For 3-16-inch sheets and heavier, 2.10c to 2.15c, Cleveland. Mill sales of black sheets, Cleveland, to consumers: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.55c to 2.70c; Nos. 18-20, 2.75c to 2.90c; Nos. 22-24, 2.85c to 3c; Nos. 25-26, 2.95c to 3.10c; No. 27, 3.05c to 3.20c; No. 28, 3.15c to 3.30c. On galvanized sheets we quote mill sales in carload lots, Cleveland, as follows: Nos. 10 and 11, 2.60c to 2.75c; Nos. 12-14, 2.70c to 2.85c; Nos. 15-17, 2.80c to 2.95c; Nos. 18-21, 3c to 3.15c; Nos. 22-24, 3.30c to 3.45c; Nos. 25-26, 3.55c to 3.70c; No. 27, 3.80c to 3.95c; No. 28, 4.05c to 4.20c; No. 29, 4.45c to 4.60c; No. 30, 4.95c to 5.10c. Galvanized sheets out of stock are quoted at 75 and 2½ off.

OLD MATERIAL.—Some improvement is reported, as mills are showing a disposition to make contracts at prices which have prevailed for a month. The exception is old iron rails, which are about $1.50 lower. The demand for machine cast scrap is brisk. We quote Cleveland prices, all gross tons, as follows:

Old iron rails	$24 00 to 24 50
Old steel rails (over 6 feet)	22 00 to 23 00
Old steel rails (6 feet and under)	21 00 to 22 00
Old car wheels	20 00 to 21 00
No. 1 R. R. wrought scrap	20 00 to 21 00
Mill scrap	19 50 to 20 00
No. 1 machine cast scrap	21 00 to 21 50
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	18 50 to 19 50
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	11 00 to 12 00
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	17 00 to 18 00
Grate bars	12 00 to 13 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 50 to 16 50
Malleable iron (railroad)	20 50 to 21 50
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	15 50 to 16 50
Heavy steel	19 00 to 20 00

PHILADELPHIA.

Jan. 6.

The week has been marked by continuation of holiday dullness and there has been very little business. Buyers are disposed to be very slow in making purchases. Foreign iron is coming in in large quantities and is having an important influence. Buyers evidently anticipate keen competition between foreign and domestic producers of pig iron at a not far distant date. Preference will be given to American iron unless it is considerably higher than foreign. Sales during the next week or two will be important as indicating what may be expected for some time to come. Shortage of fuel is likely to continue.

PIG IRON.—Cargo lots of Middlesboro No. 3 are selling at about $17; German, $20 to $20.25. Domestic is on a basis of $22 to $23 for No. 2 X foundry.

FINISHED MATERIAL.—Encouraging inquiries have been received, which indicate that large orders may soon be placed, but few sales are being made. Except for plates, business now booked is not large. Lower prices are not expected, however. Prices are as follows: Plates, small lots, 2.10c to 2.15c; carload lots, ¼-inch and thicker, 2c to 2.05c; universals, 2c to 2.05c; flanges, 2.10c to 2.20c; firebox, 2.25c to 2.30c; marine, 2.30c to 2.35c. Bars, steel, 1.80c to 1.85c; prompt shipments from local mills, Western steel, 1.75c to 1.80c; bar iron brings 1.02c to 1.95c for carload lots as minimum quantity. Structural material: Small sizes are quoted at 1.72c to 1.80c, but large sizes command all the way from 1.90c to 2.10c.

CINCINNATI.

Jan. 6.

The first week of the new year has been quiet, as is usual immediately following the holiday season, but in the iron trade the conditions were clearly encouraging and the outlook promising. The coke situation continues firm but not quotably changed, with spot coke quotable at $7 to $7.50, and for contracts running into next year $5.50 to $6 at the ovens fairly represents the market for foundry coke. In finished material market is steady and there is more inquiry.

PIG IRON.—The market has a steady to strong tone. There are now but few bargain lots of any grade to be had, and while the demand has not enlarged there is now more disposition to maintain prices. There is still considerable irregularity in quotations, but for No. 2 foundry for early delivery $18.75 to $19 Birmingham is well maintained. For deliveries extending through the first six months $18.50 Birmingham is generally the minimum. The lower grades of iron are attracting particular attention. It would appear that consumers of gray forge have stayed out of the market until their needs have become urgent, and while the first of these buyers were able to pick up a few bargain lots it seems that the offerings have now been so well taken, that inquiries coming in for deliveries commencing with January and February find a rather firm market. Furnace agents are reporting sales at $17 Birmingham, and today the situation look as though it would be difficult to find any gray forge iron for prompt delivery at less than this figure. From the number of inquiries coming in it would appear that the buyer had miscalculated on the quantity of low grade irons being made during the strike troubles and frequent bankings of the furnaces. There is but little business being taken for the second quarter of 1903 and in fact sales continue mainly of small lots for quick delivery. There are instances of consumers finding deliveries of contract iron disappointing and they are urging furnace agents to hurry forward these supplies and at the same time making inquiries for quotations on spot iron. This has not prevailed to a large extent, still it is believed by some that, with the hampering of railroad operation incident to winter conditions, considerable spot iron will be needed to piece out awaiting deliveries on contract. Taken altogether the situation is better. Traveling men who have been in for the holidays are out this week, and it is believed that this personal contact with buyers will result in more business. We quote for quick delivery and first quarter of 1903, f. o b. Cincinnati:

Southern Foundry No. 1	$23 00 to 23 50
Southern Foundry No. 2	22 00 to 22 50
Southern Foundry No. 3	20 75 to 21 25
Southern Foundry No. 4	20 00 to 20 75

Southern Foundry No. 1, soft	23 00 to 23 50
Southern Foundry No. 2, soft	22 00 to 22 50
Gray Forge	20 00 to 20 75
Northern Foundry No. 1	25 15 to 25 65
Northern Foundry No. 2	24 15 to 24 65
Southern car wheel iron	27 75 to 28 75

FINISHED MATERIAL.—Inquiries are better, and now that the period of taking account of stocks has passed, buyers are ready to take hold a little more freely. Orders are still for conserative quantities, but in the aggregate they constitute a fairly good demand. Current quotations are well maintained and where no advances are asked from the generally understood market prices sales are quickly effected. In merchant pipe the demand is fair, and trade is running along in the usual channel leaving but little room for comment. We quote black sheets No. 27 at 2.75c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.20c; No. 27, 3.10c; No. 16, 2.75c; No. 14, 2.65c; No. 12, 2.55c; No. 10, 2.45c. Galvanized sheets, car lots, sell at 75 and 10 percent off; less than car lots, 70 and 10 percent off. Tank plates out of store are quoted at 2.25c for ¼ inch and 2.35c for 3-16 inch. Prices for bar iron in carload lots are: 1.80c base, half extras f. o. b. Cincinnati; steel bars, 1.72c base, half extras f. o. b. Cincinnati. Both are retailed at 2c base, half extras, out of store. Beams and channels are selling 2½ to 2¾c, retail, and angles at 2.15c to 2.25c for base sizes. Merchant pipe and boiler types are quoted as follows for carload lots f. o. b. Cincinnati:

MERCHANT PIPE.

(Basing discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜-inch	66.8	56.8	63.8	53.8
½-inch	68.8	58.8	65.8	55.8
¾ to 6-inch, inclusive	73.8	63.8	70.8	60.8
7 to 12-inch, inclusive	71.8	61.8	68.8	58.8

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ in	43.8 & 5	38.8 & 5
1¾ to 2½ in	56.3 & 5	36.3 & 5
2¾ to 5 in	61.3 & 5	46.3 & 5
6 to 13 in	56.3 & 5	36.3 & 5

OLD MATERIAL.—There is no change in prices and the inquiry is somewhat improved, imparting a steady and firm tone to the market.

Old No. 1 Wrought Railroad, net tons	**$19 50 to 20 00**
Cast Machine and Foundry, net tons	16 50 to 17 00
Old Iron Rails, gross tons	**24 00 to 24 50**
Old Steel Rails, gross tons	**22 00 to 23 00**
Old Short Lengths, gross tons	17 50 to 18 00
Old Iron Axles, net tons	26 00 to 27 00
Old Chilled Car Wheels, gross tons	21 50 to 22 00
Stove Plate, net tons	**11 50 to 12 00**
Wrought Turnings, net tons	15 00 to 15 50
Cast Borings, net tons	**12 00 to 12 50**

NEW YORK.

OFFICE OF *The Iron Trade Review*.
ROOM 1909, NO. 150 NASSAU ST., Jan. 6.

PIG IRON.—The opening week of the new year in pig iron circles was without particular feature. In the matter of buying for forward delivery, a lull was noticed. Inquiries have come in, but rather by way of sounding the market. Buyers have a feeling that lower prices are imminent, and statements to the effect that the parting of the ways in the present high level of values has been reached, are frequently heard. It is believed by many that the pig iron market, at least in the near future, will be generally marked by buying of the piece-meal variety. The bright feature of the domestic pig iron situation is the gratifying reports received from foundrymen, who say that the orders now on their books will tax their capacity for several months to come, and that the prospects of future business on a profitable scale are of the brightest. Producers hold that as long as this state of affairs continues, there is little prospect of lower prices for raw material. In foreign pig iron while the "keen edge" has been taken off the buying in European centers recently, at the same time there has been no change in the belief among consumers adjacent to Atlantic seaports, that for several months they must look abroad for their supplies. However, it would seem that European buying on a large scale has seen its best days. Foreign producers themselves, judging from letters received in New York, are more emphatic in their belief in lower prices than are consumers. The probability of increasing production by furnaces on this side is appreciated, though foreign sellers, in the letters referred to, do not take account of the probable consumption in this country for the year. Speculators look upon foreign irons as an attractive field for their operations. Believing that consumers will buy only to meet early requirements, they figure that buying in limited quantities will be the rule for several months to come. They buy cargo lots, therefore, on the assumption that they can dispose of them in small tonnage, and make profits ranging from $1 to $3 per ton. Some good deals have been put through on these lines recently. The low figures at which some foreign irons sold a few weeks ago, particularly Middlesboro No. 3, were due to some of these speculators having cargoes arriving, which they were unable to dispose of except at cost prices, owing to the dullness prevailing at the close of the year. Just now spot iron is hard to get. One of the largest houses here—the agent of many furnaces—says that delivery within ten days is the best it can give. Prices are strong. A cargo lot of No. 2 X Northern sold a few days ago for $25, deliverable in New York. We quote: No. 1 X Northern, $23.25 to $24.25; No. 2 X, $22 to $22.75; No. 2 plain, $21 to $21.75; Southern No. 1 foundry, $23 to $23.50; No. 2 foundry, $22 to $22.50; No. 3 foundry, $21.50 to $22; No. 4 foundry, $20.50 to $21.

BILLETS.—German billets continue steady with large quantities available at prices ranging from $27.25 to $27.75. We are informed that the majority of German mills have enough orders from the United States on their books to keep busy well into the next three months.

FINISHED IRON AND STEEL.—Taken as a whole, the finished material market during the week was quiet. The American Bridge Co. reports inquiries excellent. The only building contract of note closed by it during the week was for a beet sugar refinery in Idaho, calling for 750 tons. A large contract impending for structural material in this vicinity is for the new building John Wanamaker is to erect in this city. It will take about 16,000 tons. The order will probably be given out shortly. In sheets cutting seems more pronounced than ever. The recent meeting of independent interests at Pittsburg, at which the representation was much less than hoped for, was without result. It is thought here that the policy of the independent mills, in selling at receding prices, has reached a point that calls for drastic action, either on the part of themselves or others. The market in bar iron is quiet, but prices are firm, although here and there is heard an intimation that the condition of store stocks has led to selling at a shade lower than quoted prices. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 2.50c; refined iron bars, 1.95c to 2c; soft steel bars, 1.95c to 2.10c; steel sheets, in carloads, New York, No. 28, black, 3.05c to 3.10c; galvanized, 75 and 7½ off.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*.
ROOM NO 1909, 150 NASSAU ST., Jan. 6.

PIG TIN.—During the week the market developed more strength than has been noticeable for a similar period, in some time. At this writing both spot and futures are considerably higher than this time a week ago, the advances in the former averaging at least 1¼c, with figures higher in proportion. The upward movement has been due to no development of a strictly material character, and is attributable solely to manipulation. Closing prices here today were the highest of the week. In London, the metal was especially strong, spot prices today being nearly £6 higher, by way of comparison with a week ago, with a bullish sentiment prevailing. Closing prices today at the Metal Exchange were as follows: Spot to February, 27¾c to 27⅞c; February to June, 27⅞c to 28.15c. London closings today were as follows: Spot £120 5s; futures, £126 17s 16d.

Arrivals at Atlantic ports for the month to date aggregate 1,040 tons, with 1,890 tons afloat.

COPPER.—The feature of the week in the copper market was the disappearance of much of the dullness which we have had to record in many previous reports. While the buying done was solely confined to meeting current requirements, it was in sufficient volume to give a stronger undertone to the market than it has had in weeks. The annual United States statistics of copper production, compiled by Secretary C. Mayer, of the Metal Exchange, were published during the week, and will be found below. They were eagerly digested by the trade, and evoked many adverse comments, the increase of surplus stocks being regarded as not conductive to a healthy situation. It was thought that the statistics would bring about a decline in prices, but as a matter of fact, values are higher than a week ago. In the trade, it is believed, that interests which figure largely in stock-jobbing movements are supporting the market. Copper stocks, especially of the leading interest, are now selling at the highest prices in weeks, and this lends color to the impression. In London, the market has been strong, spot selling up to £54 3s 9d, but afterwards receding. Closing prices today at the Metal Exchange were as follows: Lake, 12.20c to 24.40c; electrolytic and casting, 12.10c to 12.30c; standard, 11⅜c to 11¾c. London closings today follow: Spot, £53 12s 6d; futures, £54. Exports for the month to date amount to 330 tons.

PIG LEAD.—Quantities of 50 tons or more are selling at 4.12½c. The market in St. Louis is slightly firmer at 3.97½c. London is a little higher at £11.

SPELTER.—Continues weak, with spot selling at 4.62½c. For spot to February, 4.70c is quoted. In St. Louis the market still remains weak at 4.35c. London is £19 17s 6d.

ANTIMONY.—Prices are a shade lower than a week ago, Cookson's commanding 8¼c to 8½c; Hallett's, 7c to 7¼c; and other brands, 6¾c to 7c.

NICKEL.—Unchanged. Prices average 40c to 60c, according to quantity.

QUICKSILVER.—Jobbers only are in the market, and sales have been made on the basis of $48 per flask in lots of 100 flasks. London, £8 15s.

COPPER STATISTICS.

The United States statistics of copper are as follows, in tons of 2,240 pounds:

	1902.	1901.	1900.	1899.	1898.
SUPPLIES.					
Domestic production	293,830	266,716	270,588	261,313	235,050
Net importations	74,927	61,286	38,182	39,858	12,900
Total supplies	368,757	328,002	308,770	301,171	247,950
EXPORTATIONS.					
To Europe	*164,266	92,908	151,988	112,637	132,419
To British North America	704	616	688	435	700
To Mexico	65	85	151	130	200
Contents of sulphate	3,400	5,332	4,025	2,392	1,062
Total exportation	168,435	98,941	156,852	115,594	134,381
CONSUMPTION.					
Estimated home consumption	203,000	165,000	150,000	162,000	114,000
STOCKS AT END OF YEAR.					
Stocks include stocks at the the mines, on transportation, at refineries and in warehouses	133,813	136,491	72,430	76,512	46,935

*These figures include 1,026 tons to Asia, Africa, Australia and South America.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Jan. 6.

The market shows a little more firmness, though buyers appear not to be in a hurry about placing contracts for forward deliveries. Consumers are generally busy at the present time taking inventory of stocks, and the light buying is attributed to this cause. Copper and pig tin are higher. We quote jobbers' prices as follows:

Lake copper, carload lots, 11⅞c; less than carload lots, 12c to 12¼c. Pig tin, 27¼c; pig lead, carload lots, 4.05c to 4.07½c; less than carload lots, 4.10c. Sheet zinc, carload lots 6¼c, and 6⅜c in lots of 600 pounds. Spelter, carload lots, 4.05c; less than carload lots, 5c to 6c. Antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's in small quantities. Nickel, 5c to 6c, according to size of order and delivery. Demand for old metals is quick. Selling prices of dealers are as follows: Copper wire, $10.25; heavy copper, $10.25; light copper, $9.25; red brass, $10.25; yellow brass, $7.75; light brass, $6.50; lead pipe, $3.90; zinc, $3.75.

PERSONAL.

William Wieman will take charge of the Cleveland office of Robert Field on Jan. 15. He will sell the Sloss-Sheffield Steel & Iron Co.'s pig iron in that territory. He has been connected with the Cincinnati office of Robert Field.

E. L. McGary, of Pittsburg, has become consulting engineer of the Crucible Steel Co. of America and has discontinued his engineering offices so far as the taking of general business is concerned.

Harry D. Thompson, of the Ohio plant of the National Steel Co., Youngstown, O., has been appointed master mechanic to succeed L. A. Treat, who resigned the first of the year.

Prof. T. S. C. Lowe, the inventor of a new coking process with which the Jones & Laughlin Steel Co. is experimenting, was in Pittsburg last week for the inspection of the new plant. It will shortly be placed in operation.

William White, Jr., of Pittsburg, consulting engineer of the new steel plant under erection at Monterey, Mex., left for the latter place last week to be present at the starting of operations.

Henry A. Urban, of Newcastle, Ind., has been appointed district manager of the Ames Shovel & Tool Co., of Boston, owner of the shovel factories in Anderson, Elwood and Richmond, Ind. Mr. Urban will move to Anderson.

H. B. Sturtevant, formerly superintendent of the Ashland mine on the Gogebic range, later of the Pioneer mine at Ely, Minn., and in the last year engaged in precious metal mining in the West, will have charge of the development of Rogers, Brown & Co.'s properties on the Mesabi range.

A. Louden Richards, superintendent of the Tidewater Steel Co.'s plate mills, has accepted the position of general manager of the Saxton Iron & Steel Co.'s plant at Coatesville, Pa.

Sterling W. Hubbard, lately with Mathew Addy & Co., of Cincinnati, is now connected with the Cleveland office of Rogers, Brown & Co.

H. H. Dickey, heading a syndicate, has purchased the interest of A. F. Baumgarten, of Pittsburg, in both the Maryland Sheet & Steel Co. and the Maryland Rail Co., of Cumberland, Md. At the election of officers held last week H. N. Taylor, of N. & G. Taylor Co., Philadelphia, was elected vice president of the Maryland Sheet & Steel Co. and Lewis C. Millholland was elected vice president of the Maryland Rail Co., in place of Mr. Baumgarten.

Obituary.

George A. Bannantine, president of the Banannatine Galvanized Iron Mfg. Co., St. Louis, died Dec. 30 at Philadelphia, while on his way home from Europe. He was 65 years old.

James R. McCortney, for several years president of the Bellaire Steel Co., Bellaire, O., prior to its absorption by the National Steel Co., died at Washington, D. C., Dec. 27, aged 65 years. Mr. McCortney's early business experiences was in the freight department of the B. & O. Railroad. Later he became connected with the Center Wheeling Foundry Co., afterward securing an interest in the Bellaire Steel Co. and finally becoming its head.

Chas. Shoemaker, superintendent of the Cleveland-Canton Spring Works, Canton, O., died at Canton, Jan. 4, aged 50 years.

Twenty-four additional mills of the American Tin Plate Co. at New Castle, Pa., resumed operations this week. An additional ten mills were placed in operation at the Shenango plant, the entire plant now being in operation while fourteen mills of the Greer plant were started. Six of the mills at this latter plant are undergoing repairs and will resume shortly. The tin house of the Shenango plant resumes next week.

Rumors that the Cleveland-Cliffs Iron Co. intends to build a blast furnace and steel plant at Toledo have been widely published by daily newspapers. We are advised that the company does not expect to build a plant of any kind at Toledo.

on which drawback was allowed increased from 183,693 tons in the fiscal year 1901, to 271,228 tons in 1902, while scrap iron dropped from 8,534 tons to 1,987 tons. Billets in 1902 amounted to about 200 tons.

As has been the case ever since the drawback system was instituted, tin plate constituted last year the most important drawback item, not only in iron and steel, but in the entire list, sugar having come, however, to be a close second. The quantity of tin plate on which drawback was paid in 1902 was 125,340,511 pounds, about the same as in 1900, roughly 2,000,000 pounds less than in 1901, and the same amount greater than in 1899. Prior to then the quantity was generally much larger. From 1884 to 1898 inclusive, the quantity averaged 133,000,000 pounds, the earlier years showing practically as high an average as the later ones, but in the past four years the quantity has averaged steadily about 125,000,000 pounds.

Imports of tin plates in late years have been almost wholly for drawback purposes, the quantity for actual domestic consumption dropping from about 550,000,000 pounds in 1888-1891 inclusive to 105,000,000 pounds in 1897. Since then the carrying of stocks has produced fiscal years in which drawback was allowed on more tin plate than was imported in the same year. The net result of the past five fiscal years has been as follows, based not on "general imports" but on "imports for immediate consumption and withdrawals from warehouse," these figures showing the movement more accurately:

	Excess imports over drawback, pounds.	Excess drawback over imports, pounds.
1898	34,013,656	
1899		11,792,801
1900	17,329,441	
1901		6,800,739
1902	74,511,879	
	125,854,976	18,593,540
	18,593,540	
Net imports for consumption	107,261,436	
Average per year	21,452,287	

These imports for domestic consumption are of course made up mainly of special roofing and fancy charcoal plates to satisfy special demands. Over 88 percent of the tin plate on which drawback was allowed in 1902 went out in the form of cans, the balance being in carpet sweepers, lined cases, tinware, etc. The total number of cans was 89,207,079. The great bulk went out at the port of New York, credited with 56,582,324 cans, this figure not representing the full importance of the movement, since the bulk of these were the five-gallon cans of the Standard Oil Co., cans from other ports being mainly small meat and other provision cans. It is to be noted that exporters of cans get a drawback not alone on the tin plate used, but also on the lead which enters into the solder, lead being dutiable at 2⅛ cents a pound, while pig tin is free.

The Moose Mountain Mining Co. and the Hutton Mining Co. have been organized at Sault Ste. Marie with an authorized capital of $1,000,000 each. The property owned by these two companies is located in Ontario, north of Sudbury. Iron ore deposits in the land were discovered some time ago by Railroad Commissioner Chase S. Osborn, of Lansing, Mich., and it is reported that he has been offered $2,000,000 for the property. Iron Ore, of Ishpeming, edited by George A. Newell, remarks: "We hope the rumor is true, but we are doubtful of the accuracy of the report. Two millions is a very pretty sum for an undeveloped mineral territory in a region where the iron ore has not been of the best quality."

The report published in daily newspapers that the American Axe & Tool Co., of New York, had secured an option on 1,000 acres near Lorain, O., and would establish large works, was not authentic. The company has not taken the option.

PLANS FOR A MODERN FOUNDRY.

F. Felkel, consulting engineer and architect, of Pittsburg, P. O. Box 1440, is receiving bids for the steel work of the foundry and power buildings of the Griswold Mfg. Co., in Erie, Pa. The foundry covers an area of about 53,000 square feet, and its principal dimensions are 180x280 feet with additional sheds. In the design of the foundry Mr. Felkel has produced a new type of buildings for industrial plants, well adapted for foundries for small work, nail mills, wire mills, sheet and tin mills, etc., where there is desired a large area of floor space, to be covered by a single roof with as few columns as possible on the floor. The difficult questions of draining such a large roof area and providing the entire floor space with even and effective light, and to securing natural ventilation, have been well taken care of in the design. The building stands north and south with its length of 180 feet and has four roofs, 32 feet above floor level, each 40 feet wide, shedding water east and west. These high roofs are separated by three lower roofs 19 feet 6 inches wide, draining all water north and south. The peaks of the lower roof are 22 feet 4 inches above floor level. Along the eastern and western high buildings are sheds about 30 feet wide. The high roofs are resting each on two longitudinal lattice girders 14 feet 6 inches high, supported by 7-inch channel columns, standing 60 feet apart. This allows eight continuous rows of roof lights of about 160 feet length, the two outside rows of which are 12 feet 3¼ inches high, and the six inside are 8 feet 3½ inches high. The north and south gable ends of the four high parts have inclined roof lights about 14 feet long for their entire width, set at an angle of 30 degrees, and the low roofs have peaked skylights 7 feet 3 inches wide.

The structural steel work is self-supporting with 9-inch brick and glass for the outside walls, and has been very economically designed, as the cost figures less than wood construction for a building of this size. The centers of the high roofs are located over the centers of the working alleys at the floor which lead to the tumbling and finishing rooms, and to the shipping platforms.

The two cupolas with common platform about 20x60 feet size are located at a cross alley in the center of the foundry building, and an underground duct with track and conveyor is proposed for their connection with pig iron and coke sheds. The power building is 50x100 feet, and 22 feet high to roof trusses. Besides the buildings above mentioned there are to be constructed a tumbler building 25x230 feet, a finishing building 50x180 feet, and a two-story pattern shop, and a pattern-storage 40x50 feet. The Griswold Mfg. Co. manufactures finished hollow ware, "Erie" aluminum cast ware, light castings, stove furniture, etc.

Independent Workmen Organizing.

The National League of Independent Workmen of America is being organized with headquarters at Albany, N. Y. It is proposed to put a national organizer in the field and to organize local branches all over the country and demand that employers run their shops as 'open' shops' in which union and league men can have an equal and fair chance for employment. The specific objects are stated as follows: To protect independent workmen in their independence; to sustain high wages by skillful, energetic co-operation with our employers; to establish reasonable hours of labor according to the exigencies of the trades; to promote intelligent understanding of our work; to furnish favorable conditions for training apprentices in order that our boys may become successful workmen; to maintain sanitary conditions of employment by means of state laws and inspectors; to compel officers of the government to enforce the laws; to compel labor unions to observe the laws; to protect members against unjust treatment from employers by due process of law; to provide a labor bureau for its members.

The Columbus Iron & Steel Co., Columbus, O., has purchased the Raven Coal Co., whose properties are located on the Kanawha & Hocking railroad, in West Virginia. The property bought has a daily output of between 500 and 600 tons of coal. The company has had considerable difficulty in securing a sufficient supply of coke to keep the furnaces going, and it will mine its own fuel and make its own coke. A block of ovens will be built at once.

THE IRON TRADE REVIEW

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G. H. GARDNER, President and Treasurer,
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A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - - - EDITOR.
ROBERT I. CLEGG, - - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - - - ASSOCIATE EDITOR.

CHICAGO: 519 Monadnock Block, GEO. H. GRIFFITHS, Manager.
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THE STEEL CORPORATION'S BONUS PLAN.

In the first few months of the United States Steel Corporation, when popular wonder was stimulated by every new move of those in authority, it was intimated that a scheme would be announced in due time which should represent a distinct step beyond any existing system of profit-sharing. While the plan made public at the opening of the new year is not essentially new and could not be, many of its features are as unique in their way as this great organization is unique among corporations. It takes more than a single reading of the circulars printed elsewhere in this issue to get an adequate idea of the plan, and failure to understand its import was in part responsible, no doubt, for some hasty expressions of opposition that have been printed. No intelligent or fair minded person can read into the proposal a covert attempt to tie up an employe so that he cannot leave the company's employ without loss. It is only a diseased state of mind that finds in every proposition from employers some hidden designs upon the liberty of the employe to choose the conditions under which he will work.

One of the interesting statements contained in the circular to the stockholders is that which looks to a closer community of management than heretofore. The presidents of the subsidiary companies will all have a voice in recommending expenditures for improvements, whereas it has been the custom thus far for individual presidents to recommend, each for his own company, the improvement plans which the corporation officers and the corporation committees have finally decided. The interest of every subsidiary officer in the profits of each individual corporation is to be enlisted in a more special way than heretofore.

The stockholding proposition which applies to all officers and employes of the subsidiary companies is broad and liberal. It is not surprising to hear that as it comes to be understood it is being responded to by men in all the companies, 16,000 shares having been already subscribed. The preferred stock of the company to the extent of 25,000 shares is offered this month for subscription, and annual offerings will be made hereafter. Under the terms of this proposition an employe receiving, say, $1,100 salary a year can subscribe for $165 worth of this stock. At $82.50 a share he could buy exactly 2 shares. On this he receives $14 dividend a year. Paying for the stock at the rate of 25 percent of his salary a month, he would receive his two shares within seven months. For the following five years he receives not only his 7 percent dividend—and we see no necessity for assuming that this will not always be earned by the preferred stock—and in addition, if he has been efficient and faithful, $5 a year for each share, or $10. Thus in these five years he receives a yearly return of $24 on an investment of $165, or nearly 15 percent. In addition, at the end of the five years, he receives a further dividend, the amount of which is not yet determined.

The profit sharing plan is addressed to the men engaged directly or indirectly in managing the affairs of the corporation and provides for a division of a percentage of any profits above $80,000,000 a year, ranging from 1 percent of all profits, when they are between $80,000,000 and $90,000,000, to 2½ percent of all profits, when they are between $150,000,000 and $160,000,000. Half the sum so distributed is given in cash and the other half in stock, which is awarded after five years service.

One of the theoretical criticisms of industrial consolidations has been their supposed inability to enlist fully the interest of minor officials and other employes because of the alleged elimination of individualism. Experience has failed to substantiate the criticism. But whatever of individual enthusiasm and loyalty the consolidation movement has taken away, this quasi partnership feature of the steel corporation of 1903 should go far toward restoring and intensifying them. Should 1903 bring earnings of $120,000,000, for example, as is not improbable, there would be $2,160,000 of profits to distribute among those who have borne the responsibilities of management in some capacity.

In thus making it greatly to the interest of employes to study the interest of the corporation, the creators of this plan have shown a wise and uncommon grasp of a problem about which employers, ever so liberal and ever so alert for workable betterment features, have been much in doubt. What remains is that the application of the plan shall be as wise as its conception. The greatest difficulty will be that growing out of the very vastness and machine-like character of the scheme. But even so, it should appeal to ambition and self-interest and go far toward making the working body of this colossal corporation a community impelled by mutual interest.

DRAWBACK OPERATIONS IN THE IRON INDUSTRY.

Statistics are just now available of the drawback operations in the fiscal year ended June 30, 1902. It is much more widely known than formerly that on the export of any article made wholly or partly from imported materials, the government allows on such exportation, under certain restrictions, a rebate of 99 percent of the duty originally paid. But despite this more general knowledge, the amount of drawback paid in the last fiscal year showed no increase over the two previous years, although the drawback operations in all of the past three years have been more extensive than in 1899. Following are the amounts of drawback paid in the past four fiscal years:

Year ended June 30, 1899	$3,793,886
Year ended June 30, 1900	5,430,398
Year ended June 30, 1901	5,215,502
Year ended June 30, 1902	4,947,663

Changes among the many articles on which drawback has been allowed are too mixed to make any general analysis profitable. Alcohol, hides and sugar have dropped off, burlaps and molasses have increased, and so on. Lead ore has decreased, due possibly to more being smelted in bond, while metallic lead has increased.

We find in the statistics so far available no promise of the considerable quantities of iron and steel imported in the last calendar year for drawback purposes. Such imports doubtless came so late that the drawback would only be payable after July 1 last. Iron ore and scrap were the only items in the iron and steel list of any importance outside of tin plate. The quantity of iron ore

CINCINNATI MACHINERY MARKET.

The machinery trade generally has closed a very satisfactory year and the outlook for the new year is very encouraging. While it may be noted that for the past sixty days there has not been that urgent rush of orders which was for a long time so characteristic of the market, trade is by no means slow and most of the shops are still behind on orders. There is no accumulation of stock and machines find buyers upon completion, or are sold before ready. In heavy machinery particularly the trade is good, and shops equipped for this class of work have about all the business they can take care of. The foreign trade remains an unimportant part of the general business. Jobbers of machinery are not sending in so many orders just now, but with the usual changes and starting of new enterprises, accompanying the beginning of a new year, improvement is looked for in this direction.

The Cincinnati Machine Tool Co. reports business good and some increase in foreign orders especially from France. They are getting a little behind on their orders owing to the increase in new business. They have now in hand a special order for one of their 42-inch drills with new patent tapping attachment, of increased height, making it one of the largest upright drills ever shipped from Cincinnati. It will be shipped to France.

The Bradford Machine Tool Co. reports business good. They are running full time and have not accumulated any stock. They have orders for everything now in hand. The outlook is good for the coming year.

The American Laundry & Machinery Co. is now moving into its new plant at Norwood. They have secured five acres of ground and have built an office and warehouse 250x87 feet, two stories, a machine shop 320x87 feet, one story, and a work shop 100x150 feet, one story. There will also be a separate building for the power plant. Buildings are all of pressed brick. They have installed a new Harrisburg Ideal engine 300 horsepower, two Erie City boilers 150 horsepower each and have placed orders for a number of new machines.

The Cincinnati Elevator Works are taking a good share of the orders in the new large buildings being erected here. They have just completed work for the Siefert Company, Geo. H. Strietmann's Sons Building, J. W. Weller & Co., The Commercial Tribune Building, Louis Seasongood and have a large contract under way at Ashland, Ky.

The Cincinnati Gas & Electric Co. are erecting a new electric power station which will be one of the largest in the country. The interior will be open with boilers, machinery and brick stack carried on steel columns. The boiler room is to be 90x165 feet, 80 feet high and engine room 60x252 feet, 86 feet high. The former will be equipped with sixteen 540 horsepower boilers, provided with patent under feed stokers and two patent coal and ash conveyers. The power house will be provided with two steel stacks lined with brick each 200 feet high and 14 feet in diameter. In the engine room will be two 5,000-horsepower vertical cross compound engines connected directly to 3,500-k. w. Bullock electric generators. It will be equipped with a 50 ton traveling crane 53 feet long, also vertical marine condensers, feed pumps and heaters. The company has under construction three distributing stations, each building 24x90 feet.

The Cincinnati Screw & Tap Co. is just completing the installation of new machines at a cost of $10,000 which will increase its capacity about 20 percent.

The Cincinnati Punch & Shear Co. report the close of a good year's business and the outlook favorable for the coming year. Orders have been up to or ahead of capacity for prompt shipment right along.

The Hoefinghoff & Laue Foundry Co. changed its name on Jan. 1, to the Ballman & Wilson Foundry Co. The officers will remain the same as at present.

Demands for an increase of from 10 to 20 percent in wages have been made in Chicago by brass workers, machinists, engineers and firemen, upon 88 manufacturing concerns. The new scale affects about 10,000 men and it is proposed to put it into effect Jan. 20.

CENTRAL AND EASTERN PENNSYLVANIA.

(Special Correspondence.)

HARRISBURG, Jan. 6.—The mills and furnaces east of the Alleghenies are once more in the throes of a fuel shortage from which there is little relief in sight. Furnaces dependent upon anthracite and coke are fairly well off, but the furnaces depending entirely upon coke are in a bad way. The supply has been irregular and a number of stacks have lost time because of the conditions on the railroads. Even furnaces along the main lines of the railroads from the coke regions can not keep going.

Interviews had with men prominent in the iron and steel industry of the eastern part of the State are to the effect that a great deal of business has been booked for the new year and that prices are satisfactory, but no one can tell the fuel or labor conditions a month ahead. Many mills have six months' work in sight and there are talked of numerous projects which will mean more work. The railroad companies have given out a great deal of business indicating preparations for continuance of the traffic which has seriously hampered them for the last six or eight months.

Furnaces and mills in the Harrisburg, Lebanon, Reading and Columbia districts have been more or less interrupted by lack of fuel and there are few companies which have not men out on the railroads inspecting conditions at the mines and ovens so that supplies will be anticipated.

Comparatively little foreign material is coming in now, although the quantity is considerable as compared with a year ago. Pig iron is in demand and good prices have been obtained from companies in this part of Pennsylvania. Still more will be required in the Susquehanna Valley when three new open-hearth plants are started this year.

The Pennsylvania Steel Co. has decided to build a battery of coke ovens at its Lebanon furnaces and the construction will be started at once. This is the first step to be taken by this company to make itself independent of the coke companies, through whose failure to deliver it has frequently been compelled to close its furnaces. The company will probably extend the plant and one may be built in the neighborhood of Steelton, where its principal works are located. The Lackawanna company has ovens at its Colebrook furnaces.

The National Tube Co. is installing additional electrical equipment at its Middletown works. The plant at that place has had a prosperous year and much export business has been shipped.

The Reading company repaired 475 locomotives at its new Reading shops in 1902. It was the greatest year for engine work ever known at Reading.

The Pennsylvania Steel Co. has blown out No. 2 furnace for repairs.

The Pottstown Iron Co. has closed all but two of its mills because of trade conditions and affairs are not very bright in Pottstown. The number of men employed in the iron industries is smaller than at this time last year.

Orr, Painters & Co. will make some improvements to their Reading works during the present suspension.

Pay rolls of the Pennsylvania Steel Co.'s works contained 8,850 names on the last day of the year.

The Harrisburg Foundry & Machine Works have received the order for a large engine for the new Carolina Steel Co., of Burlington N. C. The works has also received the contract for the twenty-fourth engine it has furnished to the Pittsburg Coal Co. A. B. H., Jr.

A meeting of the stockholders of the Emlyn Iron Works, Chicago, will be held Feb. 10, to consider the proposal to increase the capital stock of the company from $250,000 to $500,000. The company contemplates increasing the efficiency and capacity of its plant at East Chicago, should the stockholders take favorable action. At present, these works have a capacity of about 4,000 tons of bar iron and steel a month, and when the changes in view are finished the tonnage will be increased to 5,500 tons.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

At the meeting of the Pittsburg Foundrymen's Association, held at Pittsburg, Pa., Monday evening, January 5, the topic under discussion was "Fan Blowers," and an able paper on the subject was presented by R. B. Hayward, Pittsburg, representative of the B. F. Sturtevant Co. There was no discussion as to the relative value of the positive pressure and fan types, and it was decided to have the former discussed at some future meeting. Regarding the use of the fan blower some of the foundrymen stated that they had achieved excellent results from the use of fans, some of them doing excellent service for a period of 25 years. The installation of fans having sufficient volume, according to the statements of some of the foundrymen present, was particularly desirable, one stating that by the installation of a larger fan at his plant the fan could be operated at less speed, requiring less power, and the melt was materially increased. As to the operation of the fan towards the end of a heat, one of the foundrymen stated that he usually increased the pressure owing to clogging up of the tuyers. The following were present:

Wm. Yagle, Wm. Yagle & Co.
Jno. McLaren, Phillips & McLaren.
J. S. McCormick, J. S McCormick Co.
F. H. Zimmers, Union Foundry & Machine Co.
D. J. Thomas, Sterritt-Thomas Foundry Co.
E. Wentz, Seaman-Sleeth Co.
E. E. Hockensmith, Hockensmith Wheel & Mine Car Co.
John F. Birch, Pittsburg Malleable Iron Co.
S. D. Sleeth, Westinghouse Air Brake Co.
W. J. Reardon, Westinghouse Electric & Mfg. Co.
L. E. Dunlap, Mackintosh-Hemphill & Co.
Chas. Baur, Sterritt-Thomas Foundry Co.
John Schick, Westinghouse Air Brake Co.
Chas. W. Winder, Westinghouse Electric & Mfg. Co.
J. Hunter Sleeth, Westinghouse Air Brake Co.
Mr. Rosenburg, S. Obermayer, Co.
D. B. Adams, Hydraulic Machine Co.
S. W. Hay, Whiting Foundry & Equipment Co.
E. G. Seaman, S. Obermayer Co.
H. J. Dorsey, Enterprise Foundry Co.
H. E. Spilker, Sterritt-Thomas Foundry Co.
C. F. Menges, Taylor-Wilson & Co.
A. W. Slocum, Keystone Car Wheel Co.
B. D. Fuller, Westinghouse Electric & Mfg. Co.
S. H. Stupakoff, Fullman Co.
R. B. Hayward, Pittsburg representative of the B. F. Sturtevant Co.
Cash Jones, Rosedale Foundry Co.
Mr. Farnum, Whiting Foundry & Equipment Co.
E. D. Frohman, S. Obermayer Co.
A. O. Backert, *The Iron Trade Review.*
Richard Muse, Marshall Foundry & Structural Works.

The Fan Blower for the Cupola Furnaces.

EXTRACTS FROM THE PAPER BY R. B. HAYWARD.

For a considerable period the blowing engine, as now used for Bessemer converters and blast furnaces, was used for blowing the cupola; but the cost of an engine to supply the required volume of air was very great, and its place was supplied by the so-called rotary blower, or positive pressure blower. This machine held undisputed sway until the development of the centrifugal fan. The fan blower of the type known as the pressure blower has practically replaced the other devices previously used. It was introduced about 30 years ago by B. F. Sturtevant and in no other country is this class of machinery produced which can compare with our own product. It is true that rotary blowers are being used at the present time, but the records of the fan manufacturer and the conclusive testimony of the authorities upon foundry practice prove that their use is limited to a very small percentage of the whole.

There are two general forms of fans for the movement of air: one is the propeller or disc wheel discharging its air in lines parallel to its axis; and the other the peripheral discharge fan with enclosing case. It may readily be seen that the disc wheel type is incapable of moving air at high pressures or against great resistances, and is therefore valueless for use in connection with the cupola furnace. However, it has a useful field in moving large or small quantities of air against atmospheric pressure. The peripheral discharge fan is built as a volume or pressure blower, although one is simply a modification of the other. In either case the mechanism consists of a blast wheel of radial arms having floats fastened to the end of the arms, presenting their flat surfaces for the movement of air. The blast wheel is enclosed in a case or housing having an outlet so placed on the periphery that it will give easy distribution of air, avoiding unnecessary bends in the piping. A blast wheel will move the maximum amount of air when it is not enclosed in a case. This fact is frequently made use of when it is desired to move large quantities of air against moderate pressures and where there is plenty of space for the construction of a large receiving chamber into which to discharge the air. Thus the function of the housing is that of a reservoir for collecting the air that it may be delivered at any desired point and further to assist in maintaining the velocity of the air received from the rotation of the blast wheel.

The distinction to be made between a volume blower and a pressure blower is that the former is designed to move a large volume of air at a low pressure and the latter is designed to move a relatively smaller quantity of air at higher pressure, which may be as high as 20 ounces per square inch.

The points of difference in construction between a volume blower and a pressure blower having the same diameter of wheel are that the volume wheel will be wider and the pressure wheel will have bridging pieces spaced at short intervals on the periphery between the extremities of the blast wheel arms, their use being to prevent the air from rolling back upon itself at high speeds. A pressure wheel is as narrow as it can be made consistently, with a given diameter, on account of the acquirements for which it is designed. It must not be supposed that the pressure blower must be of heavier construction than a volume blower for the same diameter of wheel on account of the high pressures used. On the other hand, the volume machine may require more power to operate it on account of the larger volume of air moved, even though at a considerably lower pressure than the pressure machine is working. We find, therefore, in two machines of the same wheel diameter, one a volume and the other a pressure blower, that they are designed to transmit approximately the same power.

Turning to the forces acting when a fan is in operation, the air is delivered from the tips of the blades tangentially by centrifugal force and naturally air enters the center of the wheel to replace that removed by centrifugal action. The rapidity with which these changes take place is due therefore, to the speed of the fan. If the blast wheel is not encased in a housing, the force of the peripheral flow is soon lost by reason of the fact that the particles lose their identity as air in motion by free expansion in the atmosphere. This demonstrates further that the use of the housing with its inlet and connecting piping is that of a reservoir in which a pressure is maintained by the action of the blast wheel.

This brings us to a consideration of the laws under which the forces produced by a fan in motion act. Stated briefly, the volume of air delivered by a given fan varies directly as the speed, the pressure as the square of the speed, and the power as the cube of the speed. That is to say, multiplying the speed by two multiplies the volume by two, the pressure by four, and the power by eight. If these facts could only thoroughly be impressed, endless trouble would be avoided. For instance, a fan is purchased and the buyer is told that under certain conditions and running at a given speed the fan will require so many horsepower to operate it. The data in regard to horsehower are very carefully noted but the statement as to speed is forgotten, with the result that an armature is burned out, perhaps, and the unfortunate salesman who sold the fan has his reputation for veracity very sadly impaired.

We have parallel cases in other kinds of machinery, especially in the case of a steam engine. A steam engine is so frequently rated as a 50, 100, or 200 horsepower machine, when as a matter of fact it may be developing power at a considerable variation from its rated capacity, due to differences in speed and steam pressure and variable cut-off in an automatic engine.

The work delivered by a fan is represented by the distance traveled by the effective area of the blast wheel, and by the pressure or head against which the effective area acts. This gives a product in foot pounds which with the efficiency of the machine determines the actual amount of power necessary to drive the fan under the given conditions. In operating fans it is so necessary, therefore, to bear in mind the question of power required, and fans should be selected to give the maximum amount of air required at the lowest possible pressure to carry it to its destination; for we not only save in power at the low pressures but generally speaking the efficiencies of fans at low pressures are much higher than at high pressures. Even if a fan is installed and some time later more duty is thrown upon it, it is far more economical to buy another fan of equal or one of double capacity and in the latter case, to stock the old fan, than to speed up the machine which would multiply the power by eight instead of two and which would soon eat up not only the interest on the cost of a new fan but the entire cost itself. It may seem unimportant to lay so much stress upon the matters of pressure and power, but it is readily excusable when one has observed practical engineers deliberately selecting fans with the idea that when future extensions are made the fans shall be forced up to high pressures to do the work.

In the case of the cupola or pressure blower the requirements are to deliver a comparatively small quantity of air against the resistance represented by the stock in the cupola, requiring, therefore, a comparatively high pressure. Consequently the wheel is of large diameter to obtain the required pressure with as low speed as possible and proper width to give the volume.

Many users of fans are under the impression that the velocity of air in the discharge pipe will be increased by closing off the area with a blast gate, thinking that the same volume of air passing through a smaller area must necessarily have a higher velocity. The same volume of air is never obtained, and to a limited extent only will the velocity increase. It has been proved experimentally that a centrifugal fan enclosed in a housing has the ability, when driven at a certain speed, to maintain the pressure corresponding to its peripheral velocity over an effective area, which is usually termed "the square inches of blast." This area is a critical point. If the fan be provided with an outlet smaller in area than the square inches of blast, the velocity will not be increased, even if such area be only a small percentage of the square inches of blast. If the area of outlet be larger than the square inches of blast the velocity of air passing through the outlet will be lower than the peripheral velocity.

As a rule, fans are constructed with an outlet whose area is considerably greater than the square inches of blast, so that when making tests it is necessary to provide a specially constructed temporary orifice, of area equal to the square inches of blast. The flow of air is thus restricted, which condition is approached in ordinary practice by means of the friction and resistance of piping.

The effective area, or square inches of blast, for various sizes of fans is a matter of experiment and has been very carefully determined by the Sturtevant Co. with various proportions of machines; these values are subject to variation and must be used with judgment and discretion. However, an approximate measure of this area for a given wheel is one-third of the area obtained by the product of the diameter and width of wheel, or by employing a formula:

$$\text{Square inches of blast} = \frac{DW}{X} \text{ in which}$$

D = diameter in inches;
W = width in inches at the periphery;
X = constant.

The value of this constant, as stated above, may be assumed as 3 for ordinary calculations; although much depends upon the type of fan and design of casing.

It is important that the area represented by the effective area, capacity, or square inches of blast, as it may be called, should not be confused with the area of the outlet, which is always greater than the capacity area. The volume of air delivered through the standard outlet is always greater than the volume delivered through an outlet equal in area to the capacity area, although the pressure is lower. There are good reasons for making a standard outlet larger than the capacity area. At low pressures when the efficiency is not subject to rapid changes a larger volume may be obtained with the same fan; and at higher pressures the system of piping carried out on the basis of the outlet area will tend to present a resistance to the flow of the air equivalent to the cutting down of the outlet to its capacity area. The same conditions are approached in a system of piping as is presented in operating the fan on a short outlet equal to the capacity area.

Briefly stated, it is the province of the cupola blower to furnish a volume of air necessary to the proper combustion of the fuel required to run a given heat, the required volume of air being at such a pressure as to insure its passage into the cupola against the resistance to its flow.

The various authorities upon foundry practice state the amount of air required for the melting of a ton of metal so that with a given cupola capacity a fan having a capacity fully equal to the maximum amount of air that may ever be required should be selected. It is always economical to have a larger fan than may be actually required to do the work. By having a fan that is sufficiently large, the condition is more likely to be present, of the fan delivering air amongst the fuel and iron through a total free area that is equal to or less than the square inches of blast of the fan. Consider, too, the fact that the resistances of piping, wind box and tuyeres, also do their share toward cutting down th eeffective area of the fan.

In regard to the pressures at which air should be delivered to a cupola, the authorities on foundry practice seem to agree more or less closely, the range being from four to 14 and 16 ounces, depending upon the size of the cupola, and may we say the skill or methods used in charging the cupola?

The point at which the pressure is usually measured is, of course, in the windbox. At least, the knowledge of what the pressure is at this point is of more value to the melter than what may be indicated at the fan; for owing to the losses due to transmission, there is always a drop in pressure at a given distance from the fan. By a proper proportioning of piping this loss may be limited to the fraction of an ounce; so that to obtain a desired pressure in the windbox it is necessary with properly designed piping to speed the fan to a pressure of approximately one-half ounce in excess of the desired pressure in the windbox. Emphasis should be laid, also, on avoiding sharp bends; and wherever it is necessary to change the direction of flow, it should be made with as large a radius as possible.

At an early point in this paper it was stated that the power required to operate a given fan varied as the cube of the speed, but on the other hand, the power required to operate a given fan at a constant speed is proportional to the area of the outlet. This is in line with the statement that a blast wheel delivers its maximum volume when not enclosed. If then the area of the outlet is reduced to nothing by closing the blast gate the power required to drive will be reduced to a friction load. The advantage of closing down the blast gate during the latter part of the heat when less volume is required, thereby saving power, is obvious. In this way the blast is under control of the melter at all times. In contrast with the positive pressure blower, so called, the fan blower is automatic in its action. Instead of always delivering a fixed volume, regardless of requirements, the fan blower automatically increases the volume as the resistances decrease; and when a fan is working on an area in excess of its capacity and should the resistances increase, the pressure will increase to overcome such a resistance.

A pressure gauge ought always to be used on a cupola and the melter should thoroughly understand its use, it being necessary that the tubes conveying the pressure to the water or mercury in the glass be so arranged that they

will show the true conditions inside the blast pipe. To register the true pressure the connecting tube should enter the blast pipe and turn at right angles to its length so that the air in the tube, which transmits the pressure to the mercury in the glass, will feel the full force of the air leaving the wheel at the velocity of the fan tips. If the tube enters the blast pipe at right angles to the flow of air and a fan is working on more than its capacity area, the glass will show no difference in pressure, owing to the fact that the air simply sweeps by the end of the tube and imparts no force to the column of air within the tube. However, close off the fan outlet and there will be a showing on the business end of the glass with the fan running at the same speed. This is true because fluid pressure is transmitted equally in all directions, and as air is a fluid, the pressure caused by a resistance to flow, naturally backs into the gauge glass tube and is transmitted to the liquid in the glass. Consequently, with improper arrangement the melter may think that the fan is doing no work whatever, while the belts are slipping and smoking, showing that the power is being consumed. There may be the desire to throw the fan through the charging door, when the simple truth of the matter is that the fan is too small. One other point in this connection is that there always exists a potential pressure equal to the velocity of the fan tips, notwithstanding that there may be no flow of air as when the outlet is closed, and that the power consumed is at a minimum.

Aside from the decided advantages in operation, which we have endeavored to make clear, the fan has other advantages over the rotary blower. It weighs far less, consequently costs less, requires no expensive foundations, and is less subject to repairs. To take a practical example, a case may be cited which occurred during the past few months where three positive pressure blowers were used on one system of piping for blowing three large cupolas, each nine feet in diameter inside of lining. Satisfactory results were not obtained and the blowers were replaced with three pressure blowers connected to the same system of piping, with the result that the melting capacity was doubled with far less power, and one of the positive blowers was sold at practically what the three fans cost.

Hickman, Williams & Co.

A change in the firm of Hickman, Williams & Co. will take place shortly. Frank M. Eaton, general sales agent, of the Virginia Iron, Coal & Coke Co., will resign his position to become a partner in the pig iron selling firm. The other members of the new firm are Baylor Hickman and H. L. Williams. It already has offices in Louisville, Chicago and St. Louis. Mr. Eaton will open an office in Cincinnati and probably later in Pittsburg. The firm has secured the sale for Pittsburg and the entire West for all the irons made by the Virginia Iron, Coal & Coke Co., except Reed Island charcoal iron. In addition the Chicago, Louisville and St. Louis offices will continue to handle quite a number of other irons, as will the Cincinnati office later on.

Mr. Eaton has been connected with the Virginia company since Jan. 1, 1900, as general sales agent. He was in the Birmingham district for 15 years previous, being secretary of the Woodward Iron Co. from 1894 to 1900.

The Alabama Steel & Wire Co., Birmingham, Ala., which is incorporated under the laws of Connecticut, has increased its capitalization to $5,000,000, to meet the cost of the new plant at Gadsden, Ala., which is now under construction. The company has the foundation completed for its No. 1 blast furnace and on Monday commenced erecting the stack.

R. S. Smith, president of the Union National Bank of Pittsburg, Pa., has been elected a director of the Pittsburg Steel Foundry Co. to succeed the late John G. Stephenson. Stewart Johnston is president of this company and A. Trump, secretary.

METAL WORKERS' UNIONS IN CONFERENCE.

A meeting of the chief officials of the allied metal trades' unions of the country is being held in the offices of the Amalgamated Association of Iron, Steel and Tin Plate Workers at Pittsburg, Pa., this week. The first session was held on Monday morning and the indications are that adjournment will not be taken until the end of the week. One of the most important matters under consideration is relative to the eight-hour bill now before Congress. A committee will probably be appointed to represent these trades urging the passage of this measure. In addition the Bridge and Structural Iron Workers are desirous of taking into their organization the fitters and assemblers in the structural plants of the country who are now allied with the American Federation of Labor. It is probable that the latter organization will become affiliated with the Bridge and Structural Iron Workers and that in return for this concession the structural iron workers will affiliate with the American Federation of Labor with whom they are not now allied. Those present and the organizations they represent are as follows: Charles O. Sherman, of Chicago, general secretary United Metal Workers' International union; Frank Buchanan, of Chicago, president Bridge and Structural Iron Workers; John E. Devlin, of Toledo, O., vice president International Association of Allied Metal Mechanics; Nicholas Dutle, of New York, president Metal Polishers, Buffers, Platers, Brass Molders and Brass Workers' International Union of North America; John McNeil, of Kansas City, president Brotherhood of Boilermakers and Iron Shipbuilders; Charles McCarthy, of Cincinnati, president United Metal Workers' International Union; Hugh Frayne, of Chicago, vice president Amalgamated Sheet Metal Workers' International Association; J. H. Kennedy, of Toronto, Canada, president Amalgamated Sheet Metal Workers; A. F. Liebig, secretary Wood, Wire and Metallic Lathers, and John Mulholland, president Allied Metal Workers.

Dominion Iron & Steel Co.

It is understood that the Dominion Iron & Steel Co. has decided to give up the manufacture of steel rails. The export trade was looked to as the outlet for rails, and the diversity of sections and the small size of many of the orders coming up in foreign trade prevented economical operation without the support of a large tonnage of domestic business. David Baker, general superintendent, and J. H. LeFevre and C. J. Barr, department superintendents of the Dominion company, have been in Pittsburg lately in connection with a proposal to extend the finishing end of the Sydney plant by putting in a plate mill, rod and wire mills and merchant mills. Plans have not been definitely determined as yet.

The Malleable Castings Consolidation.

Newspaper dispatches of the past week have contained the statement that the consolidation of Western and Central Western malleable castings manufacturers, of which some details were given in these columns a few weeks ago, has been given up. We are advised that the statement is incorrect; that the manufacturers concerned are still at work on the plan originally outlined and that they expect the consolidation to be effected in due time.

On Jan. 1 the Virginia Iron, Coal & Coke Co. resumed possession of its property and the management of its affairs, with offices at Radford, Va. The officers of the company are: Henry K. McHarg, president; Archer A. Phlegar, vice president; Jno. B. Newton, general manager; Wm. B. Bowles, auditor; Jno. W. Cure, secretary and treasurer; Frank M. Eaton, general sales agent; Wm. N. Morgan, purchasing agent; D. D. Hull, Jr., solicitor; R. M. Bibb, superintendent of mines. The address of the president will be No. 40 Wall St., New York, and of the other officers, Radford, Va.

LAKE SUPERIOR IRON MINES.

A considerable portion of the Clergue ore on the Mesabi range to which Mr. Clergue referred to in a recent interview printed in these columns is on State land in T. 58 R. 19, where D. E. Woodbridge has been exploring for a year for the Algoma Steel Co. A considerable tonnage has been shown there, some of it of a very high grade, coarse, low phosphorus ore. Part is not so high in iron or so low in phosphorus but will average up well with what is generally being found on the Mesabi of late. Explorations are being carried on elsewhere on the range and with good indications of ore of good quality. Royalties on State lands are 25 cents a ton and the minimums, after five years, are but 5,000 tons a year. Before that date they are $100 per annum.

The Cleveland Cliffs Iron Co. is now reported to have found a small tonnage of ore on State lands in section 10 T. 56 R. 23, where it has been working for some time. Two months ago it abandoned most of its lands in that district, however, and if a find has been made since then it is probably not of importance. The company has three drills at work in T. 59 R. 14, and is meeting good indications. The Clergues have one drill in the same town and have some little nice ore. The Zenith Furnace Co. has six drills on that town but has not yet found anything of importance. The Della Mining Co., a local speculative concern, has one drill there, and has a small find of ore under a heavy taconite capping. When the Clergue people started their drill here, no other work was under way in the township.

The expectation is that another of the large outside ore concerns will soon be taken under the wing of the United States Steel Corporation. It is one whose affiliations have always been quite close to U. S. Steel.

Drilling is reported to have commenced on section 30 T. 63 R. 11, the famous land on the Vermillion range about which there has been so much talk.

The Northwestern road has shipped out of the Lake region the past year the great total of 7,400,000 gross tons, keeping it by far the leader in ore traffic. Of this 2,500,000 tons was shipped to Ashland, all Gogebic ore; while to Escanaba there were 6,150 tons of Gogebic ore, 974,800 tons of Marquette ore, and 3,543,460 tons of Menominee ore, besides 232,000 tons all rail ore to points of consumption, Chicago, Gladstone, and elsewhere. This latter item will be much increased the coming year. The Northwestern handled from Ishpeming and Negaunee a large part of the Oliver Iron Mining Co.'s portion of Regent and Lake Superior ores, despite the fact that the Cleveland Cliffs has an interest in the two mines and owns the Lake Superior & Ishpeming road. Among its other large items from Marquette were all Champion, all Princeton, and all several smaller mines. The Duluth, South Shore & Atlantic road has not increased its ore business to any extent and is not preparing itself to handle this traffic with more economy of operation.

Capt. Alfred Buzzo, of Ishpeming, who has had charge of the Helen mine, Michipicoten district, has been at home the past few days and states that work at the Helen is encouraging in showing a larger body of ore than was expected by most and of a better grade. This corresponds with information from other sources that the ore in that mine is improving in quality in the lower workings. One very strange thing about the Helen is the now accepted fact that pockets of pyrites in the ore body do not grade gradually into ore, or vice versa, but that the line of separation is as sharply marked as though the pyrites had been shoveled into caves after the ore was deposited. Theories as to this are brought out by Messrs. A. P. Coleman and A. B. Wilmott, of the Canadian Survey, and will be referred to at length later.

Jas. Corrigan denies in an emphatic and sweeping manner that any negotiations are, or have been, under way between his company and the United States Steel Corporation for a sale to the latter of all or a part of the mine controlled by him and associates. He says that they have neither approached the steel corporation in this matter nor has the steel corporation or its subsidiary companies or any of them approached them; that they are doing well enough as it is and wish for no change.

Walter Fitch, of Beacon, general manager of the Champion mine, has been in Duluth the past week conferring with Clairton Steel Co. officials and others. He will have charge hereafter, both of Champion, Marquette range, and the Clairton properties on the Mesabi.

Some ore has been found by Duluth men in section 15 T. 56 R 23, on land belonging to the Nelson-Tenny Lumber Co., of Minneapolis. The deposit so far as now found is not large nor of especially high character.

The final monographs for the Vermillion and Mesabi ranges, by the United States Geological Survey, are in press and will be out shortly. At the time of issuance full notice will be given and the manner in which the reports can be secured will be stated. These reports are of from 400 to 500 pages each, and are of the same complete and accurate character as those previously published on the Marquette, Penokee and Crystal Falls districts. They will be illustrated with maps and plates, and that of the Vermillion range with large size detail sheets giving the results of drill and testpit work all along the explored portions of the range. The Mesabi map will cover that range from T. 60 R. 12 to west of the Mississippi river, T 55 R. 26, a distance of nearly 100 miles. It will be more full than that printed yast year, in that it will give all the ore deposits so far as possible and will more exactly define the southern contact. This contact is now better known than before on account of additional exploring work, and the latest details will be in the new maps. The work on the Mesabi has been practically that of Mr. C. K. Leith, with what assistance could be rendered by President C. R. VanHise, while that of the Vermillion was by Dr. Clements with the assistance of Messrs. VanHise, Leith and Bayley. The Mesabi report will incline to the opinion that the amount of ore available on that range, so far as explored, is about 600,000,000 tons, this being the general consensus of opinion.

The United States Steel Corporation has taken over the operation of mines recently secured by it from the Union and Sharon steel companies. Explorations of the latter company on the Vermillion range are expected by fee holders to cease. It is also expected that the Penobscot mine, at Hibbing, will be made a general pumping station for the Hull-Rust group, which it practically has been in the past; that it, a good deal more of a pumping station than an ore mine.

Pickands, Mather & Co., of Cleveland, and Joseph Sellwood, of Duluth, have purchased a lease jointly covering 80 acres in 3-57-21. The property will be known as the Cyprus mine. The lease was formerly controlled by the Great Northern interests. The property contains between 2,000,000 and 3,000,000 tons of high grade ore, and it will be an open pit mine. Butler Bros. have the contract for stripping. The fee of the property is owned by Barrows & Goff. The Cyprus adjoins the Latonia mine on the north and the Donora on the east. The lease provides for a 36 cent royalty and the Cyprus Mining Co. has been organized to own and operate the mine. The property is situated two and one-half miles west of the Mahoning. It will be in the list of new shippers over the Eastern Minnesota road next year.

The report that Pickands, Mather & Co. have been figuring on the leasing of the Section 30 lands on the Vermillion range, belonging to F. W. Eaton, R. H. Eagan and others, is declared by the company to be without foundation.

The Beaufort mine near Michigamme, Mich., is preparing for an output of 200,000 tons next year. New equipment has been installed. The mine has been acquired recently by Rogers, Brown & Co. interests, but the formal transfer has not yet been made.

The Pittsburg Coal Co. has purchased the property of the Colonial Coal & Coke Co., of Uniontown, Pa., consisting of 150 ovens and considerable coal land. The number of ovens is to be immediately increased to 500 and additional mines will be opened.

MECHANICAL PROGRESS IN 1902.

The industrial progress of the past year is a source of wonder to those who contemplate the extent of the enterprises begotten of the active stimulation of productive agencies. The immense quantity of material, finished or otherwise, that the demands of trade have involved is in itself a remarkable feature of a strenuous period; but this was but one spectacular accompaniment of the prosperity of the year. Improvements in the practice of machine shops have not had the best opportunity, in the sheer inability to meet demands, for anything more than a quickening of productive methods. Such improvements as the more general adoption of compressed air tools, the development of high speed steels for cutting tools, the greater range of the grinder, both disc and other types, and the large increase of grinding machines in size, power and extent of use, were to be expected. The screw machine has had various improvements suggested and brought into service—the carrying of the turret in the form of a ring around the bed of the lathe, the substitution of a stout stake or bearing for the bed and the mounting thereon of a turret, to rotate in a vertical plane, carrying the tools which were so arranged that by means of slides they could be moved parallel to the center line of the headstock. These and the increasing use of special feed motions of a positive character on lathes and other tools indicate the trend of shop development. The greater interest in costkeeping as an essential feature in successful management has in turn brought to light a number of interesting examples of system applied to industrial operations. These have been exploited at length in the columns of *The Iron Trade Review.*

While no radically new principle has been developed in the generation of steam there has been a marked advance toward larger units and this in turn has led to more rigid specifications for material. There has not been any noticeable tendency toward the increase of steam pressures, however. Some of the units, particularly those at the plant of the New York Gas, Electric Light & Power Co., are exceptionally large and are rated at 6,000 horsepower but are said to be capable of developing over 10,000 with safety. The gradual progress of the steam turbine during the year is suggestive of the approaching competition of the new with the older types of steam motors, though for that matter it may be claimed that the turbine itself is but a modern revival of the engine of Hero. The turbine requires so much less in the way of ground area or foundation that these advantages for supporting and compactly housing the machine will of themselves have great weight in the selection of an engine. The few parts and the general immunity from repairs, the high speed with the easily balanced construction leading naturally to ready application to the quick running machinery of the day, have done much to bring the steam turbine to the front and all indications point to a notable advance in this field of enterprise.

The continued development of electrical machinery coincidently with the increasing magnitude of the engine units and the size of these masses of material, has brought forth a new set of problems for the constructing engineer. The superintendent of the Westinghouse Electric & Mfg Co., C. C. Tyler, in a paper read at the last meeting of the American Society of Mechanical Engineers, described the latest methods of handling these ponderous pieces of machinery as exemplified in the construction of the eight 5,000-k. w. alternating current, 3-phase generators built for the Manhattan Railway Co., of New York. These machines had an extreme height from the bottom of the bed to the top of the yoke of 42 feet and the greatest horizontal distance over all is 44 feet. The bed plate, 43 feet long, was in two parts securely keyed and bolted together, each 21 feet 6 inches long by 10 feet 3 inches wide and 2 feet thick. The rotating element or field consists of many pieces, the principal ones being the cast steel hub, the two web plates of six pieces each and the four ring sections. The diameter of this element being 27 feet 8 inches over the rim sections and 32 feet over all. The total weight of the stationary and rotating elements of this machine, without the shaft, exceeded 1,000,000 pounds, or 500 tons. That this work was handled with accuracy and dispatch by aid of the transit and portable tools was in itself a notable achievement.

A year ago the scientific world was agog with excitement over the attempt to transmit the letter "S" by the aid of wireless telegraphy across the Atlantic. The attempt was not wholly credited as a success and there were not lacking those who intimated that the delicate influences at work might have been occasioned by some atmospheric disturbance entirely alien to the efforts of Marconi or his assistants. The energetic Italian has constantly labored to improve his devices and in the latter part of the year was enabled to send messages which seem to be generally accepted as bona fide. However much the inventor owes to Hertz, Branly, Lodge and others is of small importance compared to the indefatigable labor he has personally brought to bear upon the objective point. He certainly deserves to attain the goal, viz., the sending of secret messages as well as the ability to communicate without influencing other than the apparatus to which the sender is directing his work. Professor Pupin has developed a system which is said to be now at the service of Marconi and capable of supplying the long sought need. So far the new system does not seem capable, however, of doing very much injury to the established cable lines. This was feared at the outset but later developments have not shown the results to be of such a radical character as to force the cable companies out of the field they have so long occupied. In fact a 4,000 mile cable across the Pacific Ocean is now being laid and already connects the United States with Hawaii.

The progress of aeronautics has received little impetus from any novel discoveries, though several are vaguely announced and the prospect of a practical exhibit at St. Louis next year has been strengthened by an offer by the exposition authorities of a number of prizes. The flying machine which shall not require the aid of a gas envelope as a sustaining power may be perfected in the interim, but so far there has been little advance, if indeed any progress whatever, beyond the interesting experiments of Langley, Maxim and Lilienthal. The subject is an attractive one if only pursued for recreative purposes and the matter of flying machines is just now rather something of engineering romance than practical advantage.

The new East River bridge in New York and the contemplated tunnel into Manhattan to bring the lines of the Pennsylvania Railroad into the business center of the island have maintained their interest in the public eye. The former came near destruction in the early stages by a fire on one of the towers and the tunnel project in its turn was blocked persistently by some of those who were to be counted among the benefited if the undertaking was successful. Ostensibly one of the obstacles to the tunnel grant was a determination that an eight-hour day should be compulsory upon the contractors in handling their employes. Such a stipulation would come perilously near the perpetration of a grim joke. Men are not so constituted that they could stand air pressure employment at that depth for such periods. The year closed with all official opposition at an end and it is hoped that the tunnel, with the subway, will be energetically pushed to a finish.

Other important engineering developments of 1902 are the 20-hour trips between Chicago and New York; the movement toward equipping the lines from Croton to the Grand Central depot, New York, with electricity; the changing of the Elevated Railroad in that city from steam to the third rail system, and incidentally the mishaps due to the shortcomings of the electric conductors in the grip of winter—a series of difficulties which, however, had nothing more serious than delays for the passengers. The increase in capacity of ocean steamships, the record making performances of ore unloading devices on the lakes, the experiments of the Government experts with oil fuel and lastly the coal strike with its serious interference with industries—all stand out prominently in the record. The coal strike brought up anew the question of public and private privileges and their limitations. The intervention of the President, the subsequent appointment of a

commission of inquiry and the important proceedings following are fresh in mind and do not call for detailed mention. But out of such history—much of it has been crowded into the past twelve months—and the meetings of the Civic Federation, the National Metal Trades Association, the National Founders' Association, the American Federation of Labor, and other bodies, is coming an appreciation of the mutual dependence of the joint factors in industry. The labor leader of the future is more likely to be diplomat than warrior and the growing tendency to bring about such conditions as shall make the employe an interested partner in the enterprise—the payment of premiums for zealous efficiency, pensions for disability, etc.—are testimony to substantial gain in the solving of the irrepressible labor problem. Whether all this be mere commercial enterprise or dictated from sentiments of philanthropy is not so material as the certainty that a more stable condition of trade is to be the outcome. R. I. C.

The Steel Corporation and Its Union Properties.

(Special Telegram.)

PITTSBURG, Jan. 7.—Officials of some of the constituent companies of the United States Steel Corporation who visited the Sharon plant of the Union Steel Co., at Sharon, Pa., yesterday, are at Donora today inspecting the plant at that place. When this inspection is completed recommendations will be made to the executive committee of the corporation with reference to the disposition of the plants and the sale of the various lines of their products by the constituent companies. The inspection party consists of W. B. Dickson, at the head of the pig iron purchasing department of the corporation; W. P. Palmer, president of the American Steel & Wire Co.; W. T. Graham, president of the American Tin Plate Co.; Thomas Lynch, president of the H. C. Frick Coke Co.; George G. McMurtry, president of the American Sheet Steel Co.; W. E. Corey, president of the Carnegie Steel Co., and D. G. Kerr. W. B. Schiller, president of the National Tube Co., was not with the party owing to illness in his family.

Continuous Process for Tin Plate Mills.

The new continuous process of rolling tin plate invented by Charles W. Bray has been successfully tried at the Monongahela plant of the American Tin Plate Co., South Side, Pittsburg, Pa., where an experimental mill has been installed. For the past six months work has been progressing on the erection of the mills and the furnaces required, and recently the plant was completed. The rolling of tin plate proved entirely successful, reducing the labor cost fully 50 percent. At present the mill is shut down undergoing numerous changes which were found to be desirable. It is probable that these will be made within 60 days and the mill will manufacture tin plate for the trade.

This mill represents the most important advance made in recent years in tin plate rolling. It not only does away with passers and catchers, but doubles automatically. Inasmuch as the plate will not retain sufficient heat to permit of its rolling from the initial to the finishing passes without reheating, furnaces are situated between the various stands of rolls, through which the sheet passes, being reheated from time to time as the regular process requires. The plate rolled thus far has been found to be of uniform thickness, although it has been contended by tin plate workers that by mechanical rolling, tin plate of a uniform thickness could not be manufactured. Other difficulties, such as keeping the rolls at the proper temperature, have also been overcome and the extension of this method of rolling tin plate to the other mills of the American Tin Plate Co. is only a matter of time. This process can only be introduced into the mills of the American Tin Plate Co. The saving in cost will be fully 30 cents per box, and will enable the American Tin Plate Co. to secure the present drawback trade despite the recent reductions in the Welsh market.

The four open-hearth furnaces which the Sharon Steel Hoop Co., Sharon, Pa., has had under erection for nearly a year are about completed, and the first steel will be made about March 1. The blooming, billet and hoop mills are ready for operation, but the engines are not yet completed and will not be set up ready for operation for fully 60 days. Until the finishing mills can be operated no attempt will be made to operate the open-hearth furnaces. Each furnace has a capacity of about 30 tons, and the estimated weekly output is placed at 1,500 tons. All of this steel will not be finished, however, as that produced in excess of the finishing capacity will be offered in the market in the form of small billets and sheet and tin bars.

Steel Corporation Directors' Meeting.

The directors of the United States Steel Corporation, Jan. 6, declared the regular quarterly dividend of 1 percent on the common and 1¾ percent on the preferred stocks. A financial statement was issued, showing net earnings for the calendar year, with December estimated, of $132,662,000. The board amended the by-laws by increasing the number of the finance committee and Henry C. Frick and Robert Bacon were elected members. It was reported to the board that the plan for stock subscription was being well received by the employes and that within three days after opportunity to subscribe was given upwards of 16,000 shares had been subscribed for.

The Pope tin plate mill at Steubenville, O., resumed this week after being shut down for some time for repairs.

The St. Louis Malleable Casting Co., St. Louis, recently organized with a capital of $325,000, will locate its plant on land adjoining the St. Louis Car Co.'s plant. The latter company will use about half the product of the new company. It is expected that the foundry will be in operation by May 1. Contracts for the building of the plant, which will cost about $100,000, have been let.

The Western Iron & Steel Co., Chicago, has remodeled the old Boughton foundry in that city and equipped it for general foundry work. The capacity will be 30 tons of castings per day. All kinds of gray iron castings will be turned out.

Edward A. Uehling, M. E., announces that he has opened an office as consulting engineer at 135 Broadway, New York. In the past seven years, a portion of which he has spent abroad, Mr. Uehling has devoted himself to the Uehling method of casting and conveying pig iron, also to the development of pyrometers for use in blast furnace and annealing plants. He has given special attention to the problems of the waste products from the burning of coke and the smelting of iron.

Referring to its shipments of foundry facings and supplies in 1902 the S. Obermayer Co., of Cincinnati, Chicago and Pittsburg, notes that 2,940 full car loads were shipped in the year, representing 104,288,000 pounds or 52,144 net tons. If this was made in one shipment, it would consist of 27 miles of freight trains, counting 30,000 pounds to the car. This equals 3,476 cars, or at an average of 30 cars to the train, 116 train loads. The S. Obermayer Co. intends to make a number of additions in the coming year.

Exaggerated stories about discoveries of high quality red hematite iron ore in Missoula County, Montana, have been published. We are advised by John Byrne, State mine inspector of Montana, that while there is iron ore in Missoula County, the deposit has not been sufficiently developed to prove its value. He says that no effort has been made to determine the average quality.

The Tyler Tube & Pipe Co., of Washington, Pa., in announcing the death of its president, Wm. P. Tyler, already referred to in these columns, says that Mr. Tyler founded the business in 1890 and devoted the last 12 years of his life to its development. His interest in the business will remain undisturbed and his associates, who have had the benefit of an intimate knowledge of his methods and purposes, will continue it on the same lines as heretofore.

STEEL SHIPS FOR THE LAKES.

Sixty-two vessels are now building or under orders in shipyards of the great lakes for delivery during the coming season of navigation, most of them before July next. Their value will be $13,491,500. All but one, a tow barge, are steel steam vessels. The *Marine Review* says:

"The orders of the American Shipbuilding Co. (combination) are 39 in number, of 186,750 gross tons carrying capacity, and valued at $9,565,000, while yards outside of the combination have orders for 23 vessels, valued at $3,926,500, and the freighters in this list of 23 are of 44,200 gross tons carrying capacity. With few exceptions the list is made up of the largest type of ore, coal and grain carriers. In a season admitting of twenty trips, running up the lakes without cargo and bringing down iron ore or grain, which is a common practice, the new freighters, capable of carrying in one trip 230,950 gross tons, would move 4,619,000 gross tons. For 15 years past, since steel vessels began to replace the smaller wooden craft on the lakes, the end has been looked for—ships tied to the docks with nothing to do—but the movement of iron ore and other bulk freight, to which these great hulls are so well adapted, keeps on increasing at such a high rate that all records of the past seem very small when compared with the present volume of orders for new vessels.

"The array of big freighters in the American Shipbuilding Co.'s 39 orders, footing up $9,565,000, is certainly wonderful. One carferry and a passenger steamer do not go far towards relieving the monotony of the list. As an example of similarity of construction, which is one of the specializing features that has led to success in the lake trade, it is noted that one order, that of J. C. Gilchrist, of Cleveland, is for eight steamers of 6,200 gross tons capacity each, that are exact duplicates in every way. Mr. Gilchrist goes further and duplicates the same type of vessel in two others, to be built by the Columbia Iron Works, of Port Huron. Mr. A. B. Wolvin, general manager on the lakes for the United States Steel Corporation, appears as the owner of 13 of the new vessels. Ten of these are of Canadian canal dimensions and are for the great lakes and St. Lawrence transportation enterprise recently promoted by Mr. Wolvin. The other three are very large lake carriers, building for Mr. Wolvin and associates, who have profited by bringing out new vessels every year for some time past. In the line of big orders, W. W. Brown, of Cleveland, comes next with six modern steamers, and G. A. Tomlinson, of Duluth, follows with three."

Messrs. Lysaght and Sons, who are now operating iron sheet works at Wolverhampton, Eng., have decided to remove their plant to Newport, Monmouthshire. The reason given is that the trade in iron sheets is becoming more and more an export one, especially in galvanized corrugated sheets, and the change of location will enable the owners to escape freight charges which they are now paying, Newport being on the seacoast.

An important decision bearing on the rights of capital and labor was made last week in the superior court of Cincinnati. The decision was by Judge Smith in the suit of the Eureka Foundry Co. against the striking coremakers, and by its terms the strikers are perpetually enjoined from picketing the Eureka Foundry in large numbers. The strikers are allowed to have one picket at the factory, who may peacefully persuade workmen to leave their employment and advance arguments to workmen if they choose to hear such. If the workmen do not care to meet the picket, or listen to his arguments, they are not to be molested, and any attempt to influence their minds by improper means will be a transgression of the rights of the employer, and may be corrected by injunction.

The Pennsylvania Railroad Co. will begin work this month on construction contracts aggregating more than $50,000,000. The sum of $10,000,000 has been set aside for immediate use in New York City; $6,000 has been appropriated for reconstruction and enlarging the company's yards and buildings in Pittsburg; $5,000,000 has been allotted for the construction of the proposed new union station in Washington; $3,000,000 for additional track elevations and other improvements in New Jersey; $2,000,000 for improvements in Philadelphia; $1,000,000 for the construction of the projected Trenton bridge. Other expenditures to be made by railroads this year are as follows: Baltimore & Ohio, $30,000,000; Southern Pacific and Central Pacific, $40,000,000; Chicago, Rock Island & Pacific, $2,000,000; Atchison, Topeka & Santa Fe, $20,000,000.

The New Austrian Iron and Steel Syndicate.

The new combination of Austrian iron and steel companies comprises 23 concerns, with an aggregate capital of 280,000,000 kronen ($56,000,000). Each establishment is worked separately under the supervision of the central board, which regulates the output and fixes the prices. The new cartel includes practically every important iron and steel interest in Austria and Hungary, such as raw iron bars, plates, rails, nails, and wire. The agreement will remain in force for ten years, expiring on June 30, 1912. The Austrian and Hungarian cartels have been organized separately, but they will work jointly. The Austrian organization has eighteen members and the Hungarian five. It is confidently anticipated that the combination will result in a great improvement in the industrial situation, which is just now exceedingly unsatisfactory, particularly in the engineering, locomotive and wagon branches of the trade. It is stated that of the 20,000 machinists in Vienna 8,000 were recently discharged, while the wagon and locomotive works in other parts of the country are employing only half the usual number of men. One result of this state of affairs has been an increase in emigration, especially from the iron districts of Bohemia, from which hundreds of men have lately gone to Canada, Mexico and the Transvaal. The general situation, however, is likely to improve shortly when important public works will be begun, including the construction of canals, railways and bridges. The cost of the works to be undertaken in Austria and Hungary is estimated at $60,000,000 and $30,000,000 respectively.

The Iron Ore Mines of Utah.

John T. Jones, of Iron Mountain, Mich., upon whose recommendation P. L. Kimberley and F. H. Buhl, of Sharon, Pa., purchased a large tract of ore-bearing land in Iron county, Utah, writes as follows concerning the Utah deposits:

"Within a few years, Utah should be producing more iron than any other State in the Union. The deposits in the southwestern part of the State are the greatest I have ever seen, and I have examined all the principal iron deposits in the United States, Cuba and Venezuela. The close proximity of the iron to an ample supply of fuel and lime flux makes it possible to produce iron in Utah cheaper than anywhere else in the United States. Iron works can be erected in this State, which will produce iron so cheaply that, with fair railroad rates, the finished product can be laid down in Chicago on at least equal terms with the product of the United States Steel Corporation or any other producer. The low cost of production would make it possible for the Utah iron and steel works to control absolutely the trade of the western part of North and South America and the Orient. It will take a little time to get the Utah iron and steel works into shape for steady production, but when they are completed they must become an important factor in the industry in the United States."

A charter was granted to the H. Adler Co., of Pittsburg, last week, with a capital of $100,000. This company established a large sheet metal and roofing plant at Carnegie, Pa., during the past six months.

The Standard Steel Car Co., whose plant is located at Butler, Pa., has been awarded a contract for 2,000 steel framed box cars by the New York, New Haven & Hartford Railroad company and from the Delaware, Lackawanna & Western Railroad Co. a contract for 500 hopper bottom cars was received.

The Duquesne Merchant Bar Mills of the Carnegie Steel Company.

In our last issue we gave a description of the open-hearth plant and the 40-inch blooming mill at the Duquesne works of the Carnegie Steel Co. The article below completes the description of the new works, having to do particularly with the Duquesne merchant mills.

The Carnegie Steel Co. has been operating its new merchant mill department for several months. As this new department is fitted up more generously than any other plant for that class of work, some details may prove of interest. The problem was to roll rounds from 3/8-inch to 1½-inch in diameter and equivalent flats with the maximum uniformity of section and minimum cost of waste (both crop end and oxidiation), of fuel (both steam and heating), and of non-productive labor. To make uniformity of section possible, the mill must obviously be more than merely stiff. No rolls can be so held that they will not spring many thousandths of an inch. All skilled rollers and inspectors know what may perhaps be called the individual equation of their own mill, or, in other words, they can tell you about how long bars they can roll of different sizes, and not have the last end over, say, 5 to 10 thousandths of an inch larger than the first end, due to extra stiffness of the last end which has necessarily been out of the furnace as much longer than the first end as it takes the bar to make the last pass. On old mills this limitation kept the length of bars down to 50 to 150 feet.

The way to escape this limitation in length was to secure uniform heat treatment for the entire length of the bar at each pass. This uniformity is secured by the use of the continuous system of rolling from long billets whereby the last end of the billet stays in the furnace until after many passes have been made on the first end. This called for a supply of long (30 feet) billets. The old rail mill at Duquesne was fitted to roll 30-foot lengths of small billets, but could not dispose of the full tonnage of the mill. A Morgan continuous billet mill, together with a pair of Edwards flying shears, had been in service for some time to take care of the growing demand for small 30-foot billets. But these were all taken up. So a second continuous billet mill equipment was placed in connection with the new 40-inch blooming mill. This continuous mill comprises 10 trains of 14-inch rolls driven by a 44 and 78x60-inch compound condensing engine having one cylinder horizontal and one vertical.

In this mill an entire ingot weighing 6,000 or 8,000 pounds after being broken down to 4x6 inches, is received and rolled continuously to 3 inches square, 2½ inches square, 2 inches square, 1¾ inches square, or 1½ inches square, and cut to length automatically as it leaves the last pass with but one crop and one short for the entire ingot. As the severed billets pass the trigger of the flying shear they are run out on a skew-roll assembling table, where the entire group of billets from one ingot automatically line themselves up side by side. The entire group can then be pushed out by the hot pull-up slide on to the hot bed opposite to the assembling table, or in case this bed is already filled pass on to the succeeding table after the hydraulically operated stop has been lowered.

Similar stops are provided in this table for lining the billets up opposite any one of the three succeeding hot beds, on to which they can be mechanically pushed out for cooling. After the billets are cool they are pushed off the bed, loading them on cars by the cold pull-ups that are provided for each bed. The operation of all the machinery in these beds is performed by two men or boys, stationed in an elevated tower, affording them a clear view of all the beds. After the cars are loaded they are run down a slightly sloping track by gravity, allowing a new supply of empty cars to take their places, These hot beds have proved very satisfactory in handling all the material produced by this mill.

The merchant mills occupy part of the north yard of the Duquesne Works, the Union Railroad forming the connecting link along the river bank between the two yards. The plant consists of a boiler house, billet storage transept, crane room transept, furnace room with two furnaces, mill room with one

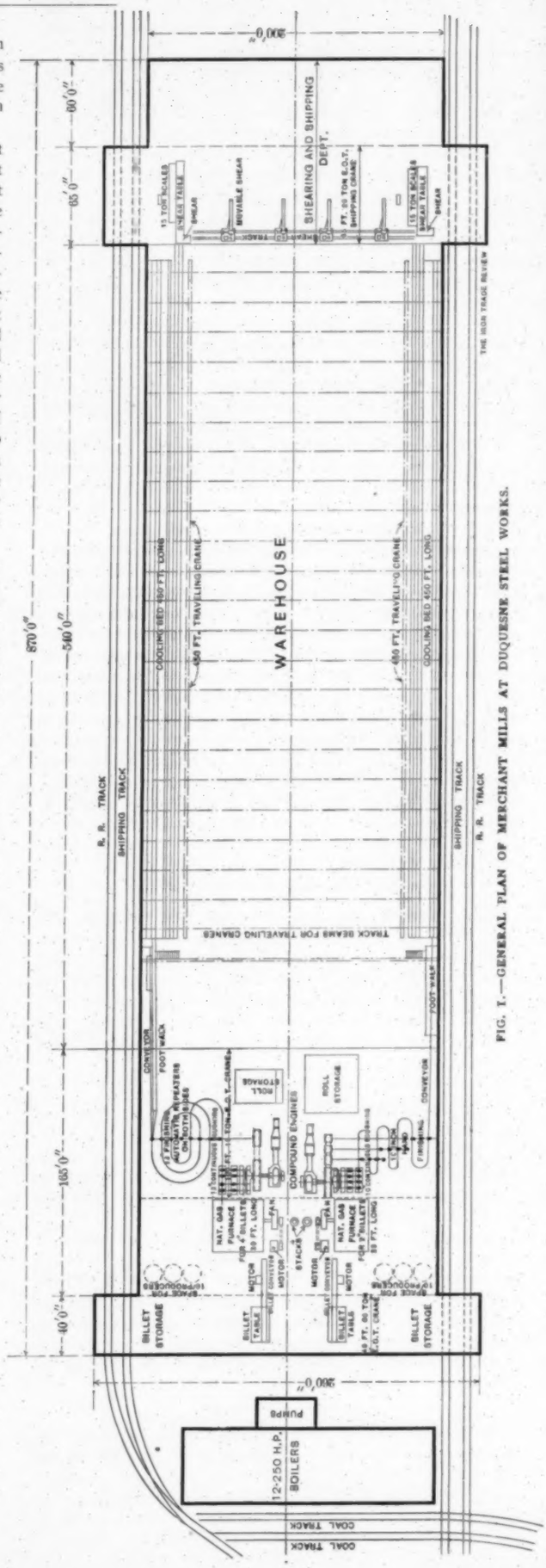


FIG. 1.—GENERAL PLAN OF MERCHANT MILLS AT DUQUESNE STEEL WORKS.

13 inch and one 10-inch mill and 100-foot crane, warehouse containing also two 450-foot cooling beds, and shipping transept containing special shears, etc. At the merchant mills the 30-foot billets are unloaded from the cars by means of a double lift electric crane after passing two chains about a 15-ton bundle of billets. The bundles are then lowered into the stock pile and the chains are left on. By leaving the chains on, the bundle is picked up when wanted without delay and even if at the bottom of the pile can be secured with but slight delay or expense. When wanted the bundle is placed on an elevated cradle, and the chains dropped off. The individual billets are then, by means of a hand wrench, rolled on to a small conveyor table, which automatically feeds them into the corresponding furnace.

The furnaces are continuous, about 32 feet square inside with suspended roofs. Natural gas is used as fuel. Although these furnaces are so large, complete control is secured by using some 15 air and gas valves. The discharging door of each furnace is close to the first pair of rolls of a 4-train continuous roughing mill. The two mills are entirely distinct and

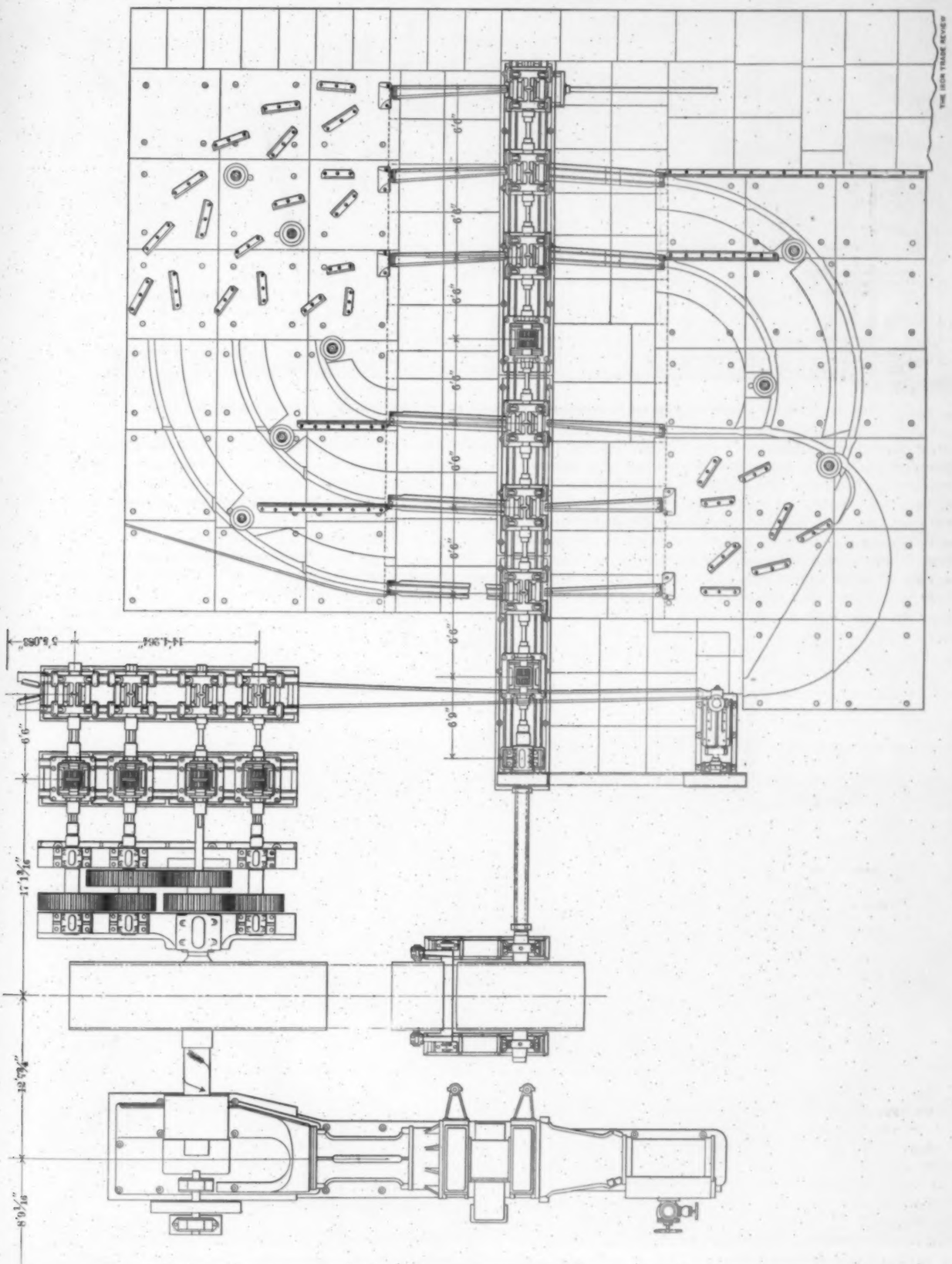


FIG. 2.—PLAN OF MORGAN MILL NO. 3. ROUGHING AND FINISHING TRAINS OF 13-INCH MILL.

disconnected from each other. The heavier mill has 10 stands of 13 inch rolls. The lighter mill has 10 stands of 10-inch rolls.

There are many peculiarities about the finishing mills. Not only the 4-train roughing, but also the six stands of finishing rolls are all pure two-high "bull heads." This secures maximum rigidity and simplicity. The 13-inch and 10-inch roughing mills are of similar design, direct driven by spur gearing from the overhanging ends of engine shafts. The engines are each 30 and 54x48-inch Buckeye tandem compound condensing. Each belts back to drive the finishing trains. The 13-inch finishing train is composed of two trains, each of three stands of 2-high rolls and one stand of 2-high pinions, the engine driving a jack shaft which is coupled to the upper pinion of one train and through the three upper rolls to the lower pinion of the second train. Thus the three pairs of rolls on one side of the central pair of pinions all run in the same direction and opposite to the three pairs at the other end. This thus the finishing train becomes an automatic mill with repeaters on both sides.

The 10-inch finishing mill is composed of three trains of two stands each, of pure two-high bull heads, each pair of rolls having its own pair of two-high pinions. The three trains are connected to three jack shafts, which are driven by a single belt from the engine. The first ends of the bars are turned into the six passes by as many men and the finishing

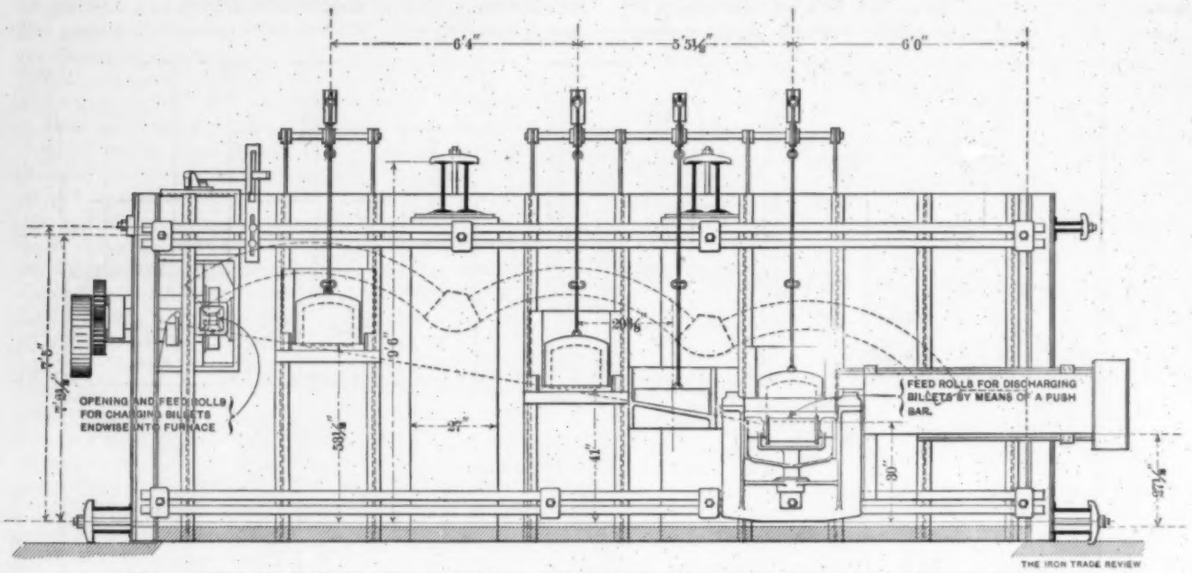

6'4"
5'5⅛"
6'0"
OPENING AND FEED ROLLS FOR CHARGING BILLETS ENDWISE INTO FURNACE
FEED ROLLS FOR DISCHARGING BILLETS BY MEANS OF A PUSH BAR.
THE IRON TRADE REVIEW

FIG. 3.—VIEW OF CHARGING END OF NATURAL GAS FURNACE FOR 2-INCH BILLETS, 30-FT. LONG, 10-INCH MILL.

the bar passes through a pipe to the cooling bed. On this mill all the speeds are so arranged that the loops grow but little, if any. This is secured not only by driving the three trains at different speeds, but by having the first pair of rolls and pinions in each train 9½ inches in diameter, and the second pair 10½ inches in diameter.

The two cooling beds are similar except as the 13 inch is heavier and wider than the 10 inch. Each is 450 feet long. Each bed is made up of five elements—a run out conveyor, a stretcher engine with opposing grip, a gravity cooling bed, an

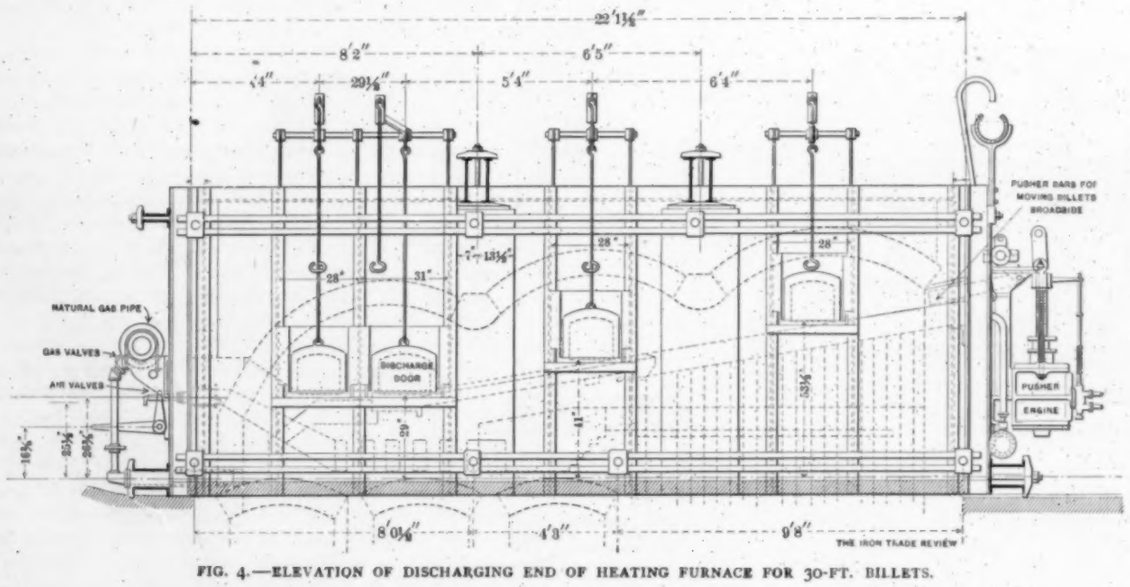


FIG. 4.—ELEVATION OF DISCHARGING END OF HEATING FURNACE FOR 30-FT. BILLETS.

arrangement renders possible repeaters of very large radius.

It will be seen that the 30-foot billet, after being roughed down, is led between a pair of feed rolls at the bottom of the slope, and around a repeater into No. 1 finishing pass, around a second repeater into No. 2 pass, and on to No. 6 pass, from which it passes up through a pipe into a long trough leading to the cooling bed. In the illustration this pipe is shown pushed back into the trough and away from the finishing pass . Twist delivery guides are used at each pass and assembling table with transfer pushers, and a driven roller shear table. Each element is 450 feet long. The run out conveyor is of novel construction. The illustration shows the conveyor with three plates removed. The advancing bar runs in the trough, being carried on the tops of the driven conveyor rolls, which project through the plates in the usual manner.

The peculiarity comes in the conveyor rolls which are conical, with upper face horizontal. The axes of the rolls are

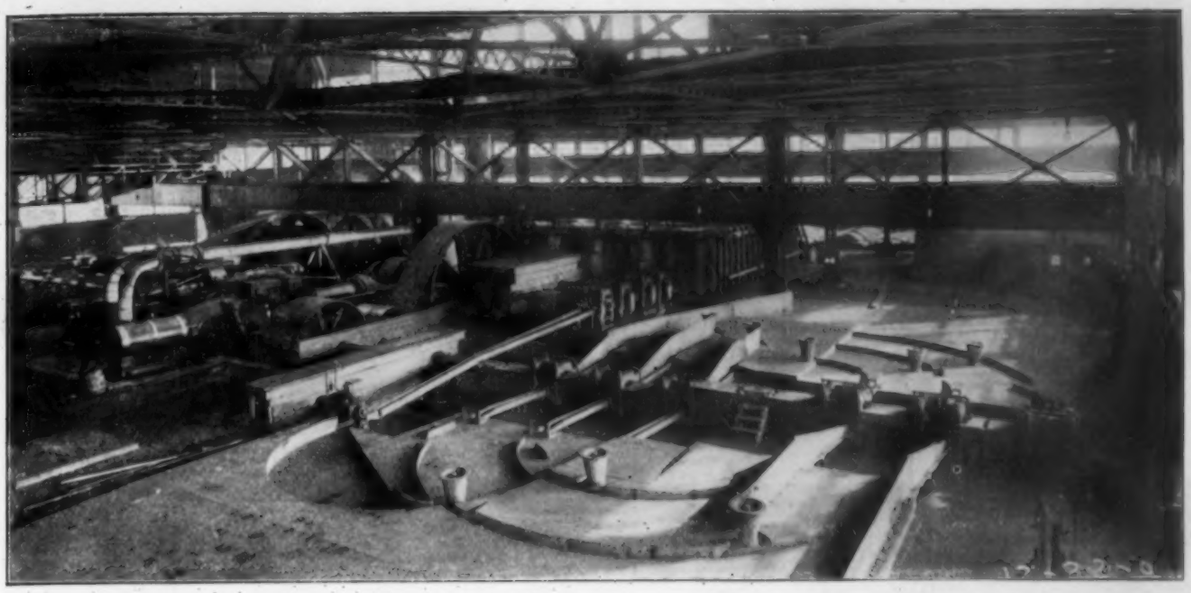


FIG. 5.—13-IN. MILL, SHOWING MORGAN CONTINUOUS FURNACE AND ROUGHING MILL, AND EDWARDS AUTOMATIC FINISHING TRAIN.

slightly out of square with the advancing bar, the points of the rolls being slightly ahead of the bases. This causes the bar to hug closely the large end of the cone and hence travel at the maximum speed. It is important to stop the advancing bar with the first end within 2 feet of the far end of the bed. The speed is very high and the bars follow each other often with less than five seconds clearance. To make this stop the bar is first transferred to the small end of the cones where the speed is very slow and the bar is lifted out of the trough by rocking the cooling bed escapement racks, each of which carries a bent wing at its upper end. Normally this wing lies below the bottom of the trough. When rocked to the other position it stands at a slope of 30 degrees and causes the bar to slide against the first line of stops, in which position it is caught at each end and slightly stretched to remove any trace of small short bends or kinks.

To return to the cone rolls. The bars are transferred broadside by changing the angle of the axes of the rolls with relation to the bar. This causes the bar to cross over to the points of the rolls. Near the points, it will be seen that there is an abrupt shoulder. As soon as the bar drops over the shoulder the rolls are at once moved back to their first position and are ready for the next bar. The previous bar in the meantime is slowly advancing on the points of the rolls. It naturally would work back to the large end but is unable to get back over the shoulder. Thus one bar will overlap the other without interference.

After the bars are lifted on to the inclined cooling bed, they are allowed to work slowly down the slope. The lifting on of each bar lets all the other bars down one notch. The bottom bar slides down on to the assembling table, where they are bunched by means of a rocking shaft carrying many levers, each with a push bar which slides out on each I beam support. When a sufficient number have accumulated to warrant shearing they are all pushed clear on to the live shear table and advanced to the shear, where they are all cropped and then cut to any desired length. The gauge bar, adjustable stop and back shear table are unusually complete. The severed bars are neatly pushed by means of a number of levers into a skeleton pocket mounted on a scale platform. After, say, 5 to 15 tons are cut, they are weighed, a couple of chains looped around them, by which they are lifted clear. After putting a couple of steel bands about the bundles they are ready to ship.

FIG. 6.—THE 450-FT. COOLING BED, SHOWING DETAILS OF CONE ROLL CONVEYOR, LIFTING WINGS AND ESCAPEMENT RACKS

IN DEFENCE OF THE PREMIUM SYSTEM.

The paper read at the December meeting of the American Society of Mechanical Engineers on "Gift Propositions for Paying Workmen" drew out a spirited discussion, which was summarized in *The Iron Trade Review* for Dec. 11. The paper by Mr. Richards was given in full, together with his introductory remarks, in our issue of Dec. 18 and we submit below the papers prepared and read at the meeting by H. M. Norris, W. Sangster and E. S. Boyer. Mr. Sangster gives a diagram to represent the increasing ability, productive rate or quantity of material involved in a sale compared with the rate of profit or remuneration. The line "C" may be caused by some special technical ability or an exclusive patent or other manufacturing monopoly and as will be seen the diagram is applicable to the employer as well as the workmen. Mr. Norris's comparison of the piece work and premium plan is apportioning the rates of increase with reference to ability of workmen and judgment of the rate fixer will be of keen interest to manufacturers generally:

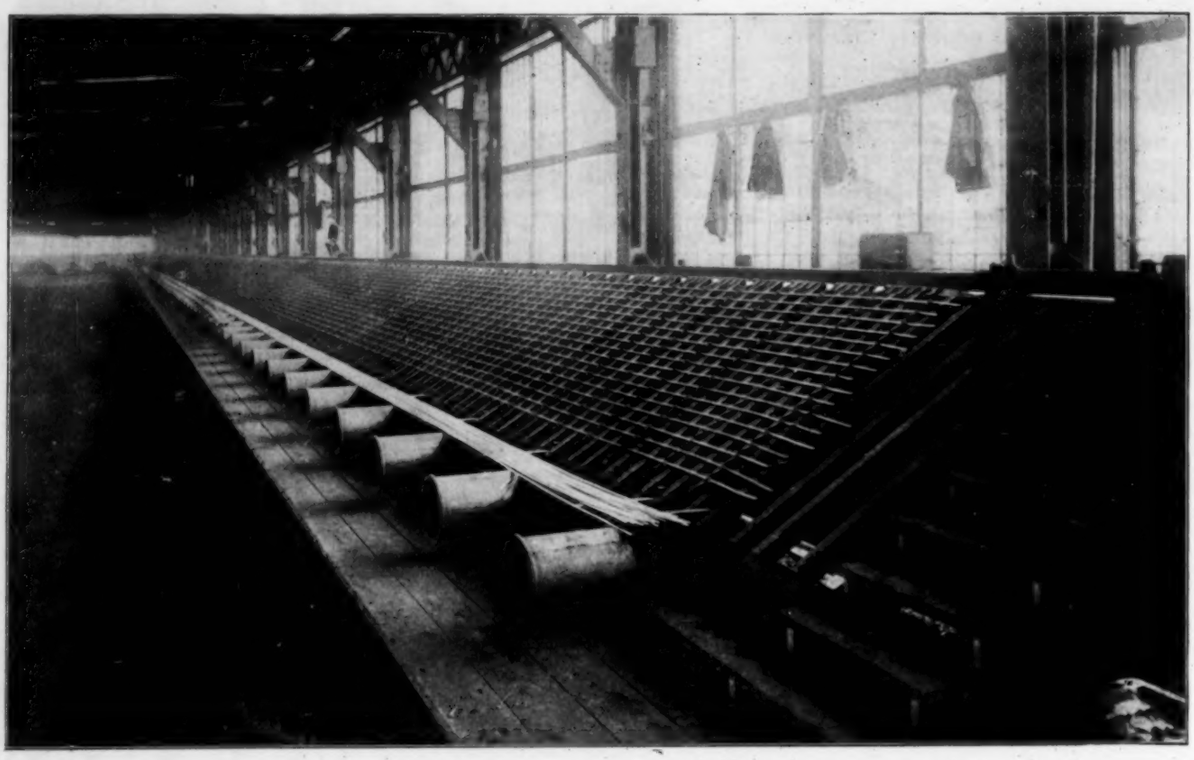


FIG. 7.—THE 450-FT. COOLING BED.

(Grip and cross head of stretcher engine at extreme right. The hot bar can be seen running out under grip links and between the top notches of bed. The gravity bed is full. The assembling table is nearly full. The last end of the bunch being sheared is seen some 60 feet down the table. The shear is too far away to be seen.)

Discussion by H. M. Norris.

Mr. Richards appears to lay great stress on the "justice and propriety" of paying pro rata for all work. If it takes five hours to machine five gears, I fail to see what possible difference it makes to the workman whether he is paid 40 cents for the first gear, 35 cents for the second, 30 for the third, 25 for the fourth, and 20 for the fifth, or at a pro rata rate of 30 cents each? The result is the same, as is also that derived from the piece work and premium systems *when one knows how to fix suitable rates.*

It is customary, I understand, to fix piece-work prices 20 percent lower than the work cost when made by the day, while under the premium plan the time limits are usually fixed according to the time spent on the work under the days-work plan. Comparing the earnings of Mr. Richards' two men on this basis, we find that the result is quite different from that shown by him—that instead of the workmen's earnings being greater under the piece-work system they are 4 percent greater under the premium plan, as per figures below, in which the premium is figured at one-half of the wages.

	Premium Plan	Piece Work
Interest on lathe and plant	$ .65	$ .65
Power and operating expenses	.35	.35
Office expenses	.50	.50
Wages at time limit of 1 hour each	3.75	
Wages at 24 cents per wheel		3.60
Total cost per day	$5.25	$5.10

It would appear from this that, properly administered, either system is equally fair to men of equal skill. We know, however, that there are not in one of our works two men who are able to produce an equal amount of good work within any given period of time, and it is due mainly to this fact that the premium plan has proved so superior to the older system.

For example: Suppose the rate-fixing department estimates that 10 hours is a fair allowance for cutting a lot of 16 gears, and that it is willing to pay a premium of nine cents per hour if the work is gotten out in this time. The time limit would then be fixed at

$$10 + [(10 \times .09) \div .15] = 16 \text{ hours.}$$

while if the work was to be given out under the piece-work system the department would probably figure as follows:

$$[10\ (.30 + .09)] \div 16 = 24\tfrac{3}{8} \text{ cents,}$$

in which event the average premium worker would be expected to earn

$$[.15\ (16 - 10) + (.30 \times 10)] \div 10 = 39 \text{ cents per hour,}$$

while the average piece-worker would earn

$$(16 \times .24\tfrac{3}{8}) \div 10 = 39 \text{ cents per hour also.}$$

So far so good; but the next lot is assigned to workmen who consume 12 hours in performing the work. The premium worker then earns

$$[.15\ (16 - 12) + (.30 \times 12)] \div 12 = 35 \text{ cents per hour}$$

while the piece-worker's earnings are but

$$(.24\tfrac{3}{8} \times 16) \div 12 = 32.5 \text{ cents per hour.}$$

Now let us suppose that the next time the job is assigned it falls into the hands of the two best men in the shop who get the work out in eight hours. The premium worker would then earn:

FIF. 8.—40-FT. GAUGE BAR AND SHEAR, SHOWING SKELETON, SCALE POCKETS AND A COUPLE OF BUNDLES READY TO SHIP.

$[.15\ (16 - 8) + (.30 \times 8)] \div 8 = 45$ cents per hour

and the piece-worker

$(.24\frac{3}{8} \times 16) \div 8 = 48.75$ cents per hour.

Putting these several results in the form of a table, we see that:

System under which work is performed.	Kind of Workman. Poor.	Fair.	Best.
Piece-work	.32½	.39	.48¾
Premium plan	.35	.39	.45

If the rates are right for the "fair" workmen, the "best" men earn more under the piece-work system while the "poor" ones earn more under the premium plan. Under the latter the "best" men earn 10 cents more than the "poor" ones, while under the former the "best" men earn 16¼ cents more than "poor" ones, which, to my mind, is a very grave fault, in that it offers too little inducement to the poor men and overpays the best. By "overpays" I mean that it rewards the men more than necessary. The object of both systems is to reduce cost to the lowest possible figure and the question is how much must be paid to

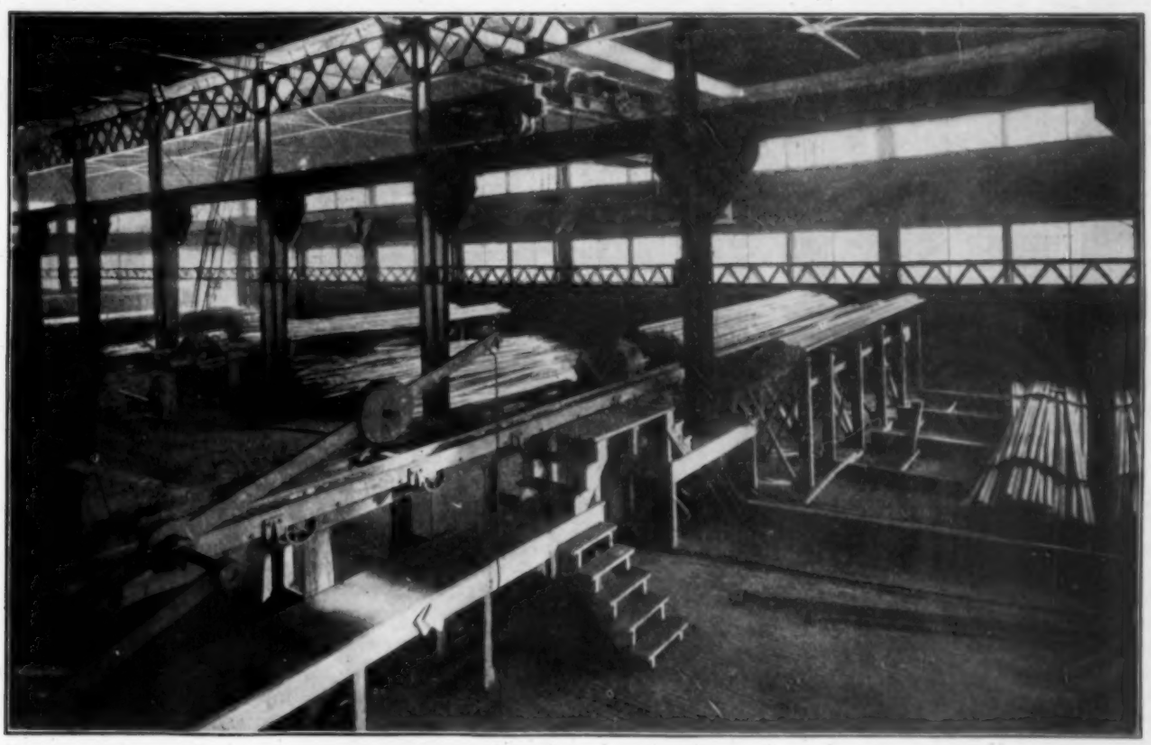


FIG. 9.—BILLET STORAGE, SHOWING BUNDLES OF BILLETS WITH CHAINS LEFT ON. ELEVATED BILLET CRADLES. FURNACE CHARGING ROLL TABLES.

effect this reduction. If too little is offered the object will fail, while if too much is offered the surplus is a direct loss.

Rate-fixing, at best, is always more or less a matter of educated guessing, and other things being equal that system is best which most effectually protects the interests of both parties to the agreement. Suppose that instead of the best men taking eight hours for machining the above lot of gears they got them out in five hours. The premium worker would receive:

$$[.15\ (16 - 5) + (.30 \times 5)] \div 5 = 63 \text{ cents per hour,}$$

while the piece worker would receive

$$(.24\tfrac{3}{8} \times 16) \div 5 = 78 \text{ cents per hour.}$$

The first increases his earnings 2.1 times, while the second increases them 2.6 times, which, in my judgment, is the opposite from " fair and equitable." Errors in rate-fixing are bound to occur under either system, and if the premium plan gives the workman an advantage when the rate is fixed too low, it is only fair that the manufacturer should have an advantage when the rate is fixed too high.

Mr. Richards admits that "the premium plan is to be admired for the sweetness of its approach and its avoidance of anything but pleasant suggestions," which is certainly one point in its favor. He must also admit that, since there is less fluctuation in the men's earnings, less care is required in fixing the rates, which will be two points gained. And he can probably be brought to admit that a rate-fixer, realizing that each time a piece price is fixed too high the firm will have to pay exorbitant wages as long as the work is manufactured, will endeavor to err the other way and fix the rates too low, thereby curtailing everyone's average earnings, in which event he must concede a third point; and it is my firm belief that the further he carries these comparisons the sooner he will join the ranks of the advocates of the premium system.

Discussion by W. Sangster.

Mr. Richards must have advanced his theory for the purpose of starting a discussion. It is directly opposed to one of the most elementary principles of shop practice, i. e., "Reduce your labor cost" and also to every custom of the commercial and manufacturing world. If we represent ability, production or quantity of material involved in a sale, by the line A we shall have the usual rate of remuneration or profit expressed by the curve B. Exceptional cases may run upward as at C but these are abnormal. A man receiving $3 per day is usually over 50 percent better than a man at $2 and, as shown in the diagram, receives less in proportion to his ability.

The wage problem can never be definitely settled. New conditions of manufacture and living continually arise and call for new adjustments. The premium system, all things considered, is the fairest method of settling the problem. A concern has the satisfaction of knowing that, while the men are increasing their own rate of wages, they at the same time are placed in a better position to meet competition. One of the natural tendencies of any concern is to reduce the selling price as soon as the cost of production warrants it. This means a larger business, more men, and, if carried out to its logical conclusion, a benefit to the first wage earner who finds his cost of living decreased while his wages have been increased.

A foreman who would set a piece of work at over 70 to 75 percent of the day cost would be considered unfit for his position and even then if he so wishes, a man can usually turn out such an increase that his wages outrun the proportion of pay to ability. There is no gift proposition about the premium system. It simply insures that instead of one man doing the thinking for several others, each man is paid for the use of his brains and his wages are increased according to the usual proportion of remuneration and ability.

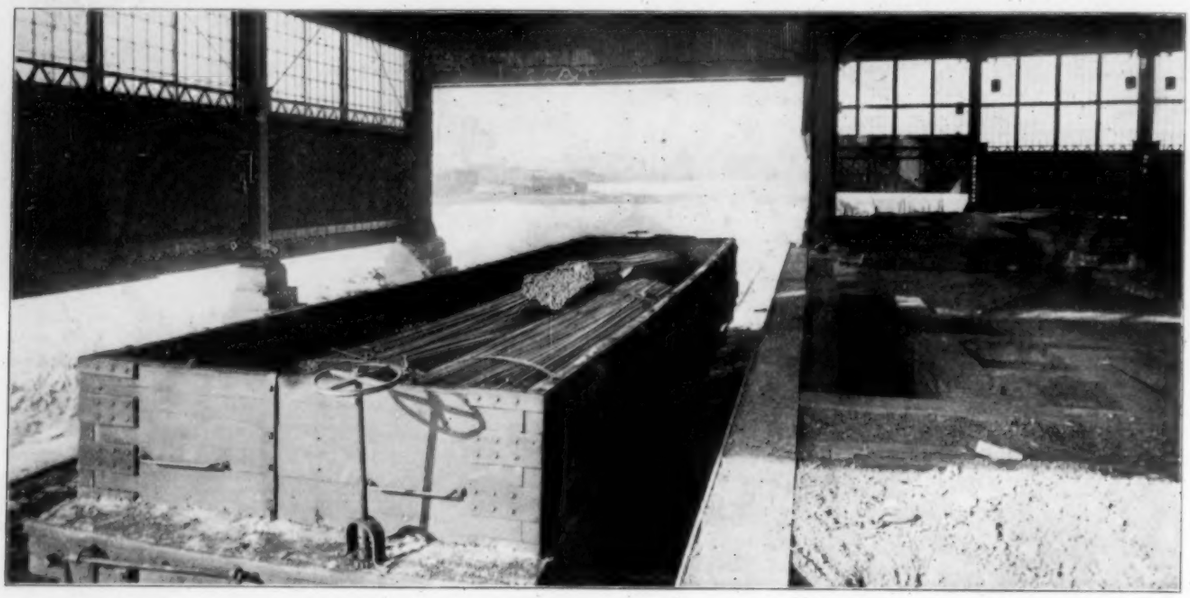
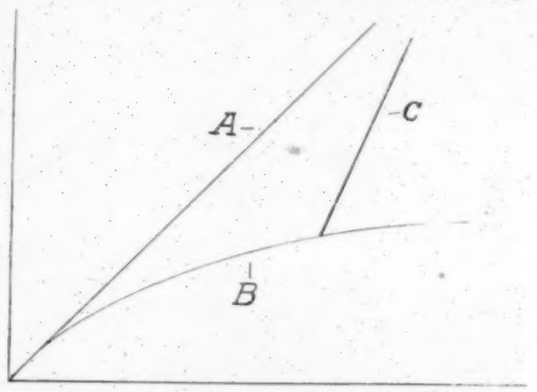


FIG. 10.—A "CAR LOAD SHIPMENT" OF THREE BUNDLES OF ⅝-INCH ROUNDS.



A SALES DIAGRAM.

Discussion by E. S. Boyer.

It seems to me that Mr. Richards has assumed that when each man turns out ten wheels per day, the men are turning out a quantity which might be expected from the average workman. The truth of the matter is however, that the average output is probably never known until the premium plan has been put into effect. Mr. Richards admits that it is the tendency of the workmen to do only the amount of work necessary to hold the job; and as the labor organizations require the same pay

for each man doing the same kind of work, the tendency of the men is to work to the standard of the least efficient workman rather than to that of the average workman.

Let us assume that there are three men, A, B and C, each running a lathe, the lathes precisely alike, and each turning out the same amount of work per day. We will assume that this work is the boring and turning of ten wheels of a special style. The wages of each man are $3 per day. The total number of wheels turned out is thirty, and the total labor cost is $9. The labor cost of each wheel, therefore, is 30 cents and the average output per man per day is ten wheels.

Now at the end of the first day that the premium plan has been in effect, we would probably find that A has turned out fourteen wheels, B twelve wheels and C ten wheels. If we give a premium of half the labor cost on the increased output, A's premium would be 60 cents, B's 30 cents and C, of course, earns no premium. We have obtained a total output of 36 wheels per day at a cost of $9.90 or an average cost per wheel of 27½ cents. We have also learned that the average output per man per day is twelve wheels. In other words, when we required an output of only ten wheels per day, we were working to the standard of the least efficient man. The effect of the premium plan has shown us that the average output per man is twelve wheels per day, and if we agree with the labor organizations that $3 per day is a fair price for the average workman on this amount of work, why have we not the right to require the average output?

Now if A, B and C each finish twelve wheels per day, the total output would be 36 wheels and should cost the employer $9 or 25 cents per wheel. Comparing this figure with the average labor cost of each wheel when the employer requires an output of ten wheels per day and and pays a premium of half the labor cost on each additional wheel, you will note that under this premium plan the employer is paying 2½ cents per wheel more than he justly should.

Robert W. Hunt & Co. of Chicago have been given the inspection of 250 steel cars, to be built by the Pressed Steel Car Co. for the Duluth, Mesabi & Northern R. R. Co., and 450 of the same class of cars, to be built by the same company for the Duluth & Iron Range Railroad Co. In addition for the latter railroad, they have a small order of 75 flat and box cars to be built at Hegewisch, Ill. They also have the inspection of 500 steel under frame box cars, to be built at Berwick, Pa., for the Philadelphia & Reading Railroad Co., and 500 steel hopper coal cars for the same road, to be built at Butler, Pa. They have just been given the inspection of 1,600 box and 500 stock cars, with pressel steel under frames, to be built at Hegewisch, Ill., for the Southern Pacific Railroad Co., and 1,000 flats, with pressed steel under frames, to be built for the same company, by the Pressed Steel Car Co., at McKees Rocks. They are engaged upon the inspection of 300 gondola cars for the Bellington & Beaver Creek Railroad Co., at Jeffersonville, Ind., and 110 coal cars for the East St. Louis & Suburban Railroad Co., to be built at Madison, Ill. The same firm's locomotive inspection department is very busy at the various works. They have just received instructions to inspect 27 locomotives at the Baldwin Locomotive Works, for the Wheeling & Lake Erie Railway Co., and they have been given an additional order by the Hocking Valley Railroad Co., for the inspection of 12 switching engines, to be built at the Brooks works.

The Granite City foundries of the American Steel & Foundry Co., at St. Louis, are to be enlarged by an addition of several buildings. Plans have been drawn and work will be started Feb. 1.

Park & Young, incorporated, of New York, have just secured some substantial orders for machine tools to be shipped to South Africa. A milling machine order has been allotted to the Brown & Sharpe Mfg. Co., of Providence, R. I.

Profit-Sharing and Stockholding Plan for Steel Corporation Employes.

On the closing day of 1902 circulars were issued by the finance committee of the United States Steel Corporation, and their substance was published throughout the country in the morning papers of Jan. 1, announcing a new plan of profit sharing and of stockowning for employes of the corporation and its subsidiary companies. These plans are so important a development in the unique history of the world's greatest corporation that we reprint the circulars in full. The gist of the essential statements of the circulars, and the substance of the plans for stock acquisition and sharing of profits by employes are contained, however, in the paragraphs immediately following:

The question of what constitutes profits, and all other questions connected with the carrying out of the olan, will be determined by the finance committee.

The plan is designed to interest a large number of officers and employes of the various companies in the general success of the steel corporation. The presidents and other officers of each subsidiary company will become interested in the profits of all the other companies. As a feature of this community plan it is announced that hereafter the question of the improvement of any plant of any subsidiary company will be discussed in a conference of presidents of all the companies, and from them go to the officers of the steel corporation, then to the executive committee and lastly to the finance committee. Heretofore such matters came up from the individual presidents.

There are 12 officers of the corporation or of subsidiary companies who receive $20,000 salary or more, the president of the corporation receiving $100,000.

Under the stockholding plan any officer or employe may subscribe for stock, the amounts they may secure under this arrangement varying from 8 to 20 percent of their salaries. The $1,000 man may subscribe for $150 in preferred stock. The first offering is in the present month and the stock may be had at $82.50 a share. The employe has three years in which to pay for his stock and is charged 5 percent interest on deferred payments.

Employes after they have fully paid for their stock will receive not only the 7 percent dividend each year but an extra dividend of $5 each year for five years if they remain in the company's employ, besides a further dividend, to be determined thereafter, if they remain through the five years.

A man who stops payment before fully paying for his stock receives back what he has paid in on principal, together with the difference between the 7 percent dividend and 5 percent interest.

The profit-sharing plan applies to managers and others in places of responsibility. Profits to be divided range from 1 percent on $80,000,000 to 2½ percent on $15,000,000.

Plan Explained to Stockholders.

To the Stockholders of the United States Steel Corporation:

Gentlemen—Enclosed you will find copy of a circular letter this day issued to the employes of the United States Steel Corporation and its subsidiary companies. This circular sets forth two plans by which it is hoped to accomplish the following objects, viz.:

First—To interest a large number of the employes of the corporation and its subsidiary companies in becoming permanent stockholders.

Second—To engage on a profit-sharing basis the services of the presidents, officers, managers, superintendents and all others charged with responsibility in managing the affairs of the corporation, thus making these men actual partners with you in the ownership and management of the corporation.

At the time of the organization of the United States Steel Corporation, many of the subsidiary companies were managed, to a greater or less degree, by men who had a very large personal pecuniary interest in them, and naturally gave to the direction of the affairs of their companies a large part or all of their time. The aim of the Steel Corporation has been

to devise some plan by which to maintain this same important incentive, but in place of having it center in comparatively few men, so to distribute its effect throughout the corporation that every man, in his place, would feel that he had become a partner in the business and would work from that point of view.

A profit-sharing plan of some kind has seemed to be the only way of reaching this most desirable end, and since the corporation was organized two years ago the finance committee has given much thought to the consideration of such a plan. The plan now announced is one that has met with unanimous approval and it will be tried. After the test of use, improvements can doubtless be suggested, and all such suggestions will be cordially welcomed and, if practicable, adopted. One of the main purposes has been to devise some plan that with equal fairness would apply to every man, from the president of the Steel Corporation itself to the man with pick and shovel working for one of the subsidiary companies. In addition it was desired to accomplish the following objects:

First—To interest the large number of young and able employes in the work of more closely organizing and systematizing the business in all its branches and ramifications, not only in connection with their own local concerns, but as an integral part of the Steel Corporation as an harmonious whole.

Second—To interest these men in reducing the general expenses as well as the particular cost of manufacture.

Third—To offer to these men an inducement to remain permanently in the corporation's service.

Merging of Subordinate Interests.

Fourth—To avoid the tendency of a profit-sharing plan pertaining solely to a constituent company to build up the profits of that company to the possible detriment of the broadest and best interests of the corporation as an harmonious whole, and therefore to base the plan on the profits of the corporation itself.

Fifth—To devise a plan by which, in the apportionment of money for the improvement and development of plants, Company A, for instance, would be interested in what Company B was doing, and Company B in what Company A was doing, constituting, as nearly as possible, automatic regulation against unnecessary duplication of appropriations.

The finance committee realizes that the accomplishment of all the above desirable results will severely test any one plan, and the plan recommended may fall short of our expectations. It has, however, been canvassed very carefully with the presidents of all the subsidiary companies, and it has met with their unanimous approval. It is believed that at the very beginning the plan will interest a substantial number of the most thrifty men, and that eventually it will interest many of them. It will be noted from the enclosed circular that of the stock which is offered for sale the working men have been allowed to subscribe for a much larger amount than the officers can subscribe for. This is because at present it is impossible to devise a plan for sharing with the laboring men profits based on their daily wages; but it is belied that profits can be shared with these men based, so to speak, on stock held by them, and especially with such men as shall continue permanently in the corporation's service. This plan will embrace a large body of men who have no part in the direct management of the corporation's affairs, are not directly responsible for results, and are not able, in any direct way, to affect the cost of manufacture or the net profits as a whole, and yet who, by their faithful service, are able to contribute much to the general gain of the corporation and should be recognized in some substantial manner.

Interest and Dividend Charges, $75,000,000.

In round figures, it requires $75,000,000 to pay the interest on the corporation's bonds, dividends at the rate of 7 percent on its preferred stock, dividends at the rate of 4 percent on its common stock, and to make sinking fund deposits.

At this date there are about 55,000 stockholders. These stockholders, of course, own the vast properties of the United States Steel Corporation. It is believed that they and other possible investors in the corporation's bonds and stocks would feel a special sense of security in the continued earning power of the corporation if they knew that the officers and the managing men generally of the entire organization were willing to enter into a contract by which part of their compensation for services rendered shall be paid only after the realization of $80,000,000 of profits; in other words, after interest on bonds, dividends on preferred and common stock, and sinking funds shall have been earned and paid or set aside.

It has been and still is intended, therefore, to make such an adjustment of salaries as shall seem proper in order that every man in the employ of the corporation or of any of its subsidiary companies will feel that he is receiving a fair and reasonable compensation for his services, and that over and above such sum he shall have an opportunity each year to earn a substantial extra sum of money, provided he and his associates shall have been successful in earning for the stockholders a substantial surplus over and above interest, dividend and sinking fund charges. The basis of this is outlined in the accompanying circular.

President's Salary, $100,000.

In the matter of adjusting salaries, we have gone far enough to know that on and after January 1, 1903, we will have in the employ of the steel corporation and of all of its subsidiary companies not to exceed 12 men with salaries of $20,000 a year or over. This includes the salary of $100,000 which is fixed as belonging to the office of president of the corporation itself. There will be not to exceed 50 men who will receive from $10,000 to $20,000 a year. There will be about 200 men who will receive from $5,000 to $10,000 a year, and something over 1,500 men who will receive from $2,500 to $5,000 a year.

We believe that the profit-sharing plan proposed in connection with the men receiving these salaries will materially quicken the interest of a large number of our men in the general success of the steel corporation, and that it will retain them permanently in its service; that it will stimulate individual effort all along the lines, giving us an increasingly solid and compact organization working for one common end, and enabling us to get general support for all plans promising further economies in manufacture and in administration. In this way more than in any other not already adopted can we provide a guaranty of the continued success of the corporation. An immediate, important and far-reaching result of thus welding together the men of all the subsidiary companies and of interesting them in working for one common object is obtained through the following important arrangement for making appropriations for maintenance, alterations and extensions of plants during the year 1903.

In the past, if any subsidiary company desired an appropriation for any purpose the president of the company made his recommendation to the officers of the steel corporation, who investigated it fully and referred it to the executive committee, which considered the matter from every point of view, and if approved passed it on to the finance committee for final action.

Conference Committee of Presidents.

Now that we are to interest the presidents and other officers of each subsidiary company in the profits of each of the other subsidiary companies, through a profit-sharing plan of the steel corporation as a whole, it will be found entirely practicable and highly advantageous to have the president of each subsidiary company give his opinion as to the advisability of a contemplated improvement or expenditure on any one of the plants, and to this end regularly to call the presidents of the subsidiary companies together as a manufacturing committee for conference. At such conferences all questions of contemplated expenditures and improvements on any plant will be discussed by the presidents of all the companies, and their recommendation will then go to the officers of the steel corporation and to the executive committee and untimately to the finance committee.

In the same way questions of purchasing supplies, and other questions of common interest, will be taken up at these presidents' meetings and will be dealt with from the broad point of view of the success of the Steel Corporation as a whole. In short, the idea, as far as possible, is to administer the interests of the Steel Corporation by committee work, and to impress on every one in authority wherever possible and of advantage to the corporation as a whole the importance of making such

plant supplement, and cooperate with, every other plant of the United States Steel Corporation.

By order of the finance committee, United States Steel Corporation.

GEORGE W. PERKINS, Chairman.

New York, December 31, 1902.

Plan Explained to Employes.

The second circular explains to those most directly interested the plan for selling stock to the employes, as follows:

To the Officers and Employes of the United States Steel Corporation and of its Subsidiary Companies:

Gentlemen—For several months the finance committee has been engaged in perfecting a plan which, in its opinion, would make it your common interest to become permanent holders of the preferred stock of the corporation. The finance committee has been endeavoring also to devise some comprehensive plan under which those of you who are charged with the responsibility of managing and directing the affairs of the corporation, or of its several subsidiary companies, shall receive compensation partly on a profit-sharing basis. The committee has not been willing to adopt any system that shall not include every employe from the president of the corporation itself to the men working by the day in the several subsidiary companies.

A plan which, in the judgment of the finance committee, will accomplish these results, was submitted to the board of directors at its December meeting, and by unanimous vote the finance committee was authorized to proceed to perfect and to promulgate the plan. It is now submitted to you, in the hope and belief that it will receive from all of you the same hearty approval that was given to it by the presidents of the several subsidiary companies, who were freely consulted while the plan was being thought out and put into shape.

The plan is divided into two parts.

Part I.—Allotment of Stocks.

From the earnings of the corporation during the year 1902 there will have been set aside at least $2,000,000, and as much more as is necessary, for the purchase of at least 25,000 shares of the corporation's preferred stock, for the purpose of making the following offer to all the employes of the Steel Corporation and its subsidiary companies:

At the present time there are in the service of the corporation and of its subsidiary companies, about 168,000 employes, whom we propose now to divide into six classes, as follows:

Class A will include all those who receive salaries of $20,000 a year or over.

Class B will include all those who receive salaries of from $10,000 to $20,000 a year.

Class C will include all those who receive salaries of from $5,000 to $10,000 a year.

Class D will include all those who receive salaries of from $2,500 to $5,000 a year.

Class E will include all those who receive salaries of from $800 to $2,500 a year.

Class F will include all those who receive salaries of $800 a year or less.

During the month of January, 1903, the above-mentioned stock will be offered to any and every man in the employ of the corporation, or any of its subsidiary companies, at the price of $82.50 per share; subscriptions for this stock to be made on blanks obtainable at the office of the treasurer of any subsidiary company.

Every man can subscribe for as much stock as he chooses, not to exceed the sum represented by a certain percentage of his annual salary, as indicated in the following table:

Limit to Subscriptions.

Any man who belongs in class A, as indicated in the preceding classification, will be allowed to subscribe for an amount of stock represented by a sum not to exceed 5 percent of his annual salary.

Class B, 8 percent.

Class C, 10 percent.

Class D, 12 percent.

Class E, 15 percent.

Class F, 20 percent.

If, on this basis of subscription, more than 25,000 shares shall be subscribed for, 25,000 shares will be awarded to the several subscribers in the order of the classes beginning with the lowest, or class F, the upper classes to receive only in case any stock shall remain untaken by the class below, and each class to receive ratably in the amount left for that class if there be not enough to satisfy the full subscription of that class, but each subscriber will be allotted at least one full share, even though this might make it necessary for the finance committee to purchase more than 25,000 shares.

Payment of the subscriptions for the stock must be made in monthly installments, to be deducted from the salary or wages of the subscriber, in such amount as he may desire, not to exceed 25 percent of any one month's salary or wages.

A man may take as long as he chooses, not exceeding three years, to pay for his stock.

Dividends on the stock will go to the subscriber from the date on which he commences to make payments on account of his subscription.

Interest at 5 percent will be charged on deferred payments on the stock.

In case a man shall discontinue poyments before his stock shall have been fully paid for, he can withdraw the money he has paid on account of principal and may keep the difference between the 5 percent interest he has paid and the 7 percent dividend he has received on the stock; and thereupon his subscription and all interest on the stock to which the same relates shall cease and determine.

Extra Dividends to be Paid.

As soon as the stock shall have been fully paid for, it will be issued in the name of the original subscriber and the certificate will be given to him, and he can then sell it any time he chooses. But as an inducement for him to keep it and to remain continuously in the employ of the corporation or of one or other of the subsidiary companies, and to have the same interest in the business that a stockholder or working partner would have, the following offer is made, viz.:

If he will not sell or part with the stock, but will keep it and in January of each year, for five years, commencing with January, 1004, will exhibit the certificate to the treasurer of the company, together with a letter from a proper official to the effect that he has been continuously in the employ of the corporation or of one or another of its subsidiary companies during the preceding year, and has shown a proper interest in its welfare and progress, he will during each of such five years receive checks at the rate of $5 a share per year. For example: If a man buys one share of this stock in January, 1903, he will undertake to pay $82.50 for it. If after paying for it he keeps it for five years he will in each year have received dividends at the rate of 7 percent on the par value of the stock, and also will have received each year an extra dividend, so to speak, of $5; this latter sum being paid him as special compensation for rendering continuous faithful service to the corporation or to one or another of its subsidiary companies, as shown by the exhibition of his certificate together with a letter from a proper official showing that he has worked to promote the best interests of the company in which he has thus become practically a partner.

If he shall remain continuously in the service of the corporation or of one or another of its subsidiary companies for five years, at the end of the fifth year the corporation intends that he shall receive a still further dividend, which cannot now be ascertained or stated, but which will be derived from the following source, viz.:

Division of Defaulted Shares.

All who subscribe for stock in January, 1903, and commence to pay for it, but who discontinue at any time during the five years, of course will not receive $5 per share for such of the five years as remain after they discontinue. The corporation will, however, pay into a special fund each year the $5 payments that would have been made to such subscribers had they continued. This fund shall be credited with 5 percent annual interest, and at the end of five years' period the total amount thus accumulated will be divided into as many parts as shall be equal to the number of shares then remaining in the hands of men who shall have continued in such employ for the whole five years, and the corporation will then by its own final determination award to each man whom it shall find deserving

thereof as many parts of such accumulated fund as shall be equal to the number of shares then held by him under this plan.

Provided, however, that if a subscriber shall have died or shall have become disabled while faithfully serving the corporation or one or another of its subsidiary companies, during such five years' period, the money theretofore paid by him on account of the stock he was purchasing, or, if he has fully paid for it, the certificate of stock may be turned over by the corporation to his estate or to him, together with a sum equal to $5 per share for each of the five years not then expired.

If this plan shall be received favorably and shall meet with success, it is intended at the close of next year to make a similar offer, excepting, of course, that the price at which the stock then will be offered cannot be guaranteed now; it is, however, the intention to offer it at about the then market price, and in all other respects to make the terms of the offer similar to those now submitted.

The continuation of this policy would make it possible for a man to buy one or more shares of the stock each year under a contract with the corporation upon terms offering a safer and more profitable investment than he could possibly find for his savings anywhere else.

In round figures it requires about $75,000,000 to pay the interest on the bonds of the corporation and of its several subsidiary companies, the dividends on the preferred and common stock, at the rates now being declared, and to make sinking fund deposits.

The board of directors has approved the recommendation of the finance committee to the effect that

Whenever $80,000,000, and less than $90,000,000, is earned during 1893, 1 percent shall be set aside.

Whenever $90,000,000, and less than $100,000,000, is earned during 1903, 1.2 percent shall be set aside;

Whenever $100,000,000, and less than $110,000,000 is earned during 1903, 1.4 percent shall be set aside;

Whenever $110,000,000, and less than $120,000,000, is earned during 1903, 1.6 percent shall be set aside;

Whenever $120,000,000, and less than $130,000,000 is earned during 1903, 1.8 percent shall be set aside;

Whenever $130,000,000, and less than $140,000,000, is earned during 1903, 2 percent shall be set aside;

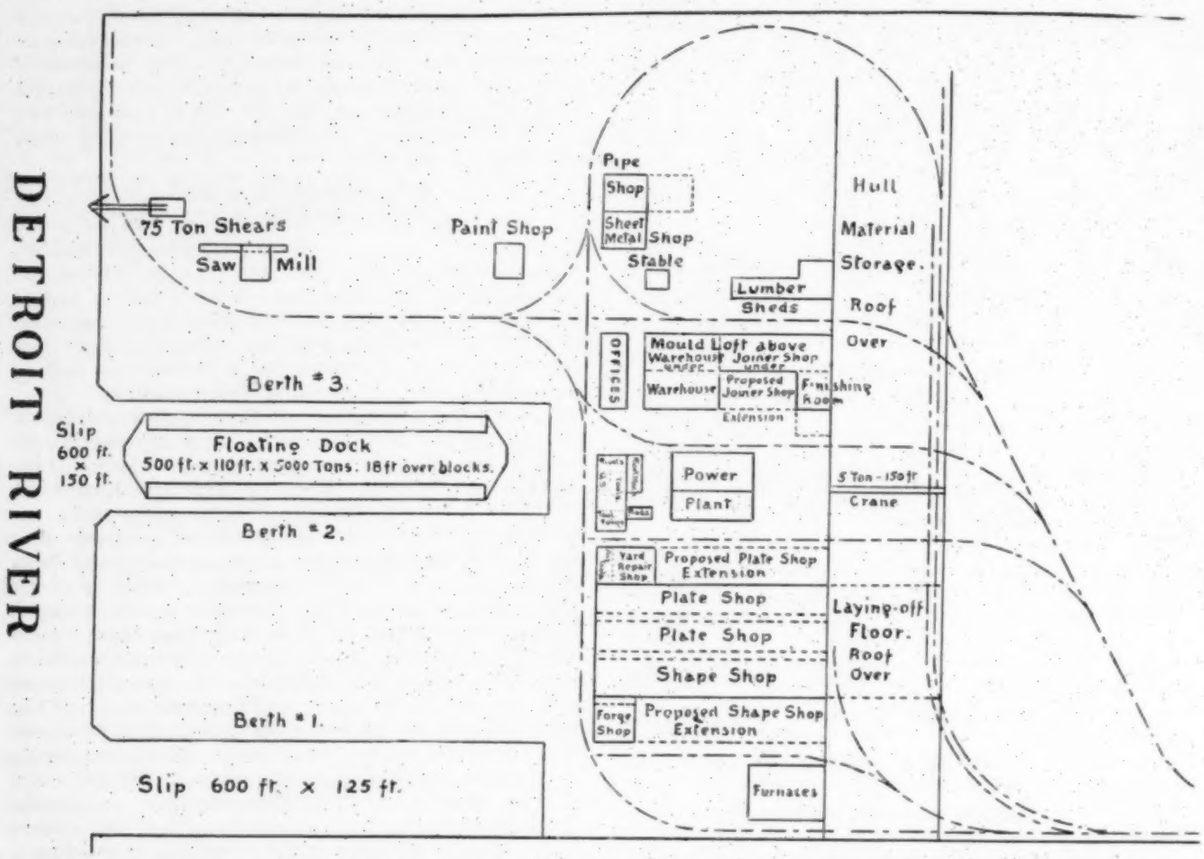


FIG. 1.—PLAN OF THE PROPOSED SHIPYARD AND FLOATING DOCK OF THE GREAT LAKES ENGINEERING WORKS, DETROIT, MICH.

Whenever $140,000,000, and less than $150,000,000 is earned during 1903, 2¼ percent shall be set aside;

Whenever $150,000,000, and less than $160,000,000, is earned during 1903, 26 percent shall be set aside.

Part II.— Profit-Sharing Plan.

During the year we have been and are now engaged in making changes and adjustments in the salaries of the men who occupy official and semi-official positions and who are engaged in directing and managing the affairs of the corporation and of its several subsidiary companies in all the various branches of the departments of mining, manufacturing and transportation.

We have been making these changes preparatory to inaugurating, on January 1, 1903, a plan by which all the men who are thus directly and indirectly charged with the responsibility of managing and operating these vast properties, will share with the stockholders in any profits made after a certain amount of annual net earnings shall have been reached, and to this end the following plan has been adopted.

Selection of the Beneficiaries.

It is intended that not only the presidents, officers, managers and superintendents shall share in these profits, but they shall be shared in as well by all other men charged with responsibility in managing the affairs of the corporation and the final selection of the men who shall share is to be made by the finance committee of the Steel Corporation. The question of what constitutes profits and all other questions shall be determined solely and finally by the finance committee, and as this committee will have no interest whatsoever, directly or indirectly, in the profit sharing plan, its ruling must be accepted by all as fair, impartial and conclusive.

We may not, in the first year, get an equitable apportionment, but it is not the intention to make permanent the above schedule or the apportionment of the same. The program is hereby an-

nounced as the plan for the year 1903, and the finance committee reserves the right to modify any apportionment that is made at the end of each quarter during the year, and reserves the right to announce this or any other plan as a substitute for this, at the end of 1903 for the year 1904.

Any profits distributed under the above schedule and to the above classes of men will be paid out as follows, for example: If $80,000,000 be earned during the year 1903, then $800,000 would be the sum set aside for distribution. It is proposed to distribute one-half of this sum in cash quarterly during the year; reserve the other half until the end of the year; and then invest it in preferred stock; divide the amount of stock thus purchased, distributing one-half to the employes who are entitled to it, and holding the other half in the hands of the treasurer of the corporation, giving each man a certificate for his interest, the certificate to recite among other things:

First. That if he remains continuously in the service of the corporation or of one or another of its subsidiary companies for five years, the stock shall be delivered to him and he may do as he likes with it.

Death Completes Payment.

Second. That if he dies and becomes totally and permanently disabled while in the employ of the corporation or of one or another of its subsidiary companies, the stock will be delivered to his estate or to him.

Third. That he can draw the dividends declared on the stock while it is held for his account and he remains in the employ of the corporation or of one or another of its subsidiary companies.

Fourth. That if without previous consent voluntarily he shall have quitted the service of the corporation or of its subsidiary companies, he shall forfeit all right to this stock, and in such case it will be held in a fund which at the end of five years will be divided among such employes as shall have complied with all the conditions.

Thus, 25 percent of all the money set aside in this profit-sharing plan will be held for five years and will be given to such only as at the end of that period shall be in the employ of the corporation or one or another of its subsidiary companies from and since January 1, 1903.

As the value of the interests of the United States Steel Corporation in the several subsidiary companies necessarily will be enhanced by everything that tends to increase their efficiency and earnings, this offer includes their employes as well as those of the corporation itself.

By order of the finance committee.

UNITED STATES STEEL CORPORATION.
George W. Perkins, Chairman.

New York, December 31, 1902.

GREAT LAKES ENGINEERING WORKS' NEW SHIPYARD.

Announcement is made by the Great Lakes Engineering Works, of Detroit, of an increase in its capital to $2,000,000 and the perfecting of plans for the establishment of a large shipyard and the building of a floating dock. These extensions follow a most successful half year's operations by this company, which it will be remembered was organized early in the summer and took over the well known engineering works of S. F. Hodge & Co. Here about 90 of the largest freighters and steamers on the lakes have received their outfits and the first triple expansion engines entering into lake service were designed and built in these works. The new company has followed in the heavy lines of machinery heretofore manufactured, and has added to them. The plans just announced bring them into the expanding field of the American Ship Building Co.

For the shipyard an ample tract has been secured a short distance down the Detroit River from the engineering works, there being 85 acres in all, with a frontage of 1,200 feet on the Detroit River. The site is just below Smith's coal dock, easily accessible by trolley line or steam road. The Michigan Central and the Detroit Southern Railroads run close to the property and sidings will be built from both.

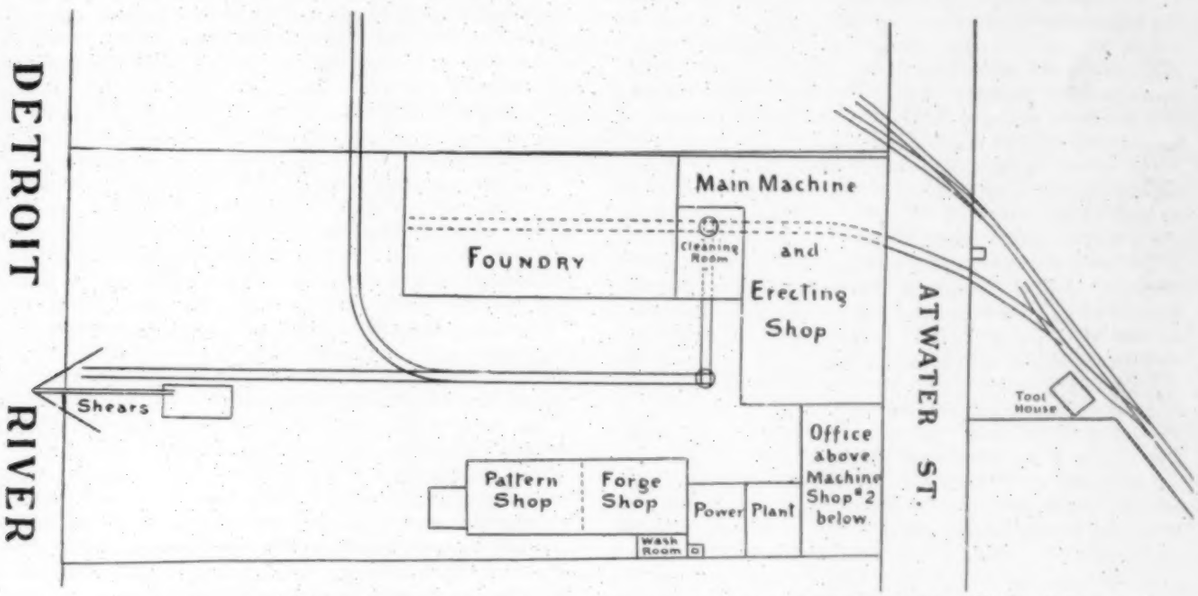


FIG. 2.—PLAN OF THE MACHINE SHOPS AND FOUNDRY OF THE GREAT LAKES ENGINEERING WORKS, DETROIT, MICH.

The accompanying views show plans of the proposed shipbuilding plant and of the present engine building works. Three berths are provided for at the shipyard, and in a ship 600x150 feet will be the floating dock, the largest of its kind on the lakes. It will be 500x110 feet, 5,000-ton capacity, 18 feet over blocks. The designers are Clark & Stanfield, the well known English naval experts. Mr. Clark is now in Detroit, in consultation with President Pessano, of the Great Lakes Engineering Works, on matters of detail relating to the new dock. The construction work on the dock will be done by the Great Lakes Engineering Works. The buildings at the shipyard will consist of the following:

Plate and shape shop, 150x300 feet; furnace shop, 70x100 feet; mold loft, 50x240 feet; joiner shop, 50x140 feet; warehouse, 100x100 feet; forge shop, 55x60 feet; power plant, 99x100 feet; yard repair shop, 50x60 feet; pipe shop, 50x60 feet, sheet metal shop, 50x60 feet; paint shop, 40x50 feet; saw-mill, 40x50 feet; tool room, 40x50 feet, air tool room, 20x50 feet; rivet room, 20x40 feet; rivet machine room, 25x40 feet; offices, 40x90 feet. The entire plant will be driven electrically. Two air compressors of 3,000 feet capacity will supply the compressed air for all the riveting, coultering and reaming-air tools being very extensively

employed in all operations to which they are applicable. The shops will be equipped with overhead electric traveling cranes and the shears, punches and bending rolls will have each its own independent air machine for handling the work. The stockyard and laying-off room and furnaces will be served by overhead electric traveling cranes, while the yard service will be performed by two 10-ton locomotive cranes capable of handling material about the yard, shifting cars and unloading material from cars. On the river front there will be large shears, with capacity of 75 tons, for lifting boilers and engines and all vessel machinery into and out of boats built in the yards or that may put alongside the dock for repairs.

The engine building plant, already in complete operation, shown in the other plan view given elsewhere, consists of the following principal buildings: Main machine and erecting shop, 160x290 feet; machine shop No. 2, four stories, 90x180 feet; foundry, 170x320 feet; cleaning room, 80x100 feet; power plant, 90x130 feet; forge shop, 90x120 feet; pattern shop, 90x140 feet.

Construction work at the new shipyard is to begin at once, so that the plant may be in readiness at the earliest possible date for work that may be given out in 1903. The company has secured the services of John S. Ubsdell, Jr., as naval architect. He will have charge of the designing and construction of vessels, the same line of work in which he was formerly engaged at the South Chicago plant of the American Ship Building Co. Henry Penton, formerly chief engineer for the Chicago Ship Building Co., has been engaged as chief engineer and designer of marine engines and machinery.

The Great Lakes Engineering Works, with its strong organization and with the large resources represented in its list of stockholders, promises to take a prominent place in the shipbuilding industry on the Great Lakes. It officers are: Antonio C. Pessano, president and general manager; Geo. H. Russel, president of the State Savings Bank, Detriot, vice president; John R. Russel, of the Russel Wheel & Foundry Co., Detroit, secretary and treasurer. In addition to the above the stockholders of the company include the following: H. W. Hoyt, Chicago, vice president the Allis-Chalmers Co.; H. C. Potter, Jr., Detroit, vice president State Savings Bank; C. L. Freer, Detroit; H. B. Ledyard, Detroit, president Michigan Central Railroad; H. M. Campbell, Detroit, of Russel & Campbell; W. G. Mather, Cleveland, president Cleveland-Cliffs Iron Co.; Henry Russel, Detroit, general attorney, Michigan Central Railroad; Jno. A Penton, Detroit, vice president the Iron & Steel Press Co., Cleveland; John H. Avery, Detroit, vice president Detroit Belle Isle & Windsor Ferry Co.; Henry Ledyard, Detroit, attorney; W. S. Russel, Detroit, vice president Russel Wheel & Foundry Co.; J. A. Ubsdell, Jr., Detroit, naval architect; Henry Penton, Detroit, marine engineer; W. J. Wickes, Wickes Bros., Saginaw, Mich.; I. W. Frank, Pittsburg, president United Engineering & Foundry Co.; O. P. Letchworth, Buffalo, president Pratt & Letchworth Co.; W. D. Sargent, New York, president American Brake Shoe & Foundry Co.

Contracts for machinery and buildings, so far as awarded, are as follows: Electric traveling gantry cranes for handling materials over the building berths, Wellman-Seaver-Morgan Engineering Co. of Cleveland; 10-ton traveling locomotive cranes to the Industrial Works, Bay City, Mich.; punches, shears, plate planers to the Cleveland Punch & Shear Works Co., Cleveland; bending rolls and boilers to Wickes Bros., Saginaw, Mich.; all the buildings of steel, to the Russel Wheel & Foundry Co., of Detroit, Mich. The engines and vertical air compressors are being built by the Great Lakes Engineering Works in their engine shops, and the floating dry dock will also be built by themselves and will be entirely of steel construction. Overhead traveling cranes in the plate and angle shops will be furnished by the Northern Engineering Works, of Detroit.

The Lackawanna Steel Co. has purchased 35 acres in North Lebanon, Pa., to add to its Colebrook furnace plant.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Fostoria Foundry & Machine Co., Fostoria, O., recently organized, has its main office in the Society for Savings Bldg., Cleveland, and its machine shop and foundry at Fostoria, O. The company makes heavy castings for blast furnaces and rolling mills, besides a general jobbing business. A specialty is made of the Seneca gas engine. O. C. Ringle is president; P. A. Connolly secretary and treasurer, and W. Wainwright, general manager.

The Beaver Valley Metal Co., of New Brighton, Pa., was recently incorporated under Pennsylvania laws with a capital of $10,000. A specialty will be made of railroad, rolling mill and blast furnace castings. Phosphor bronze, phosphor copper and brass castings will also be manufactured. W. D. Berry is president of the company, E. T. McComb vice president, and Louis A. Glaser secretary and treasurer.

The Isaac G. Johnson Co., New York City, has been incorporated with a capital of $1,000,000, to manufacture iron, steel, manganese, copper, bronze and gun metal.

The Seabring Forge Co., Seabring, O., has been incorporated with a capital of $35,000, under the laws of Delaware.

The Greene Furnace Co., Grand Rapids, Mich., has been incorporated to manufacture the Greene patented furnace for steam boilers.

The Richards Mfg. Co., Aurora, Ill., has been incorporated with a capital of $49,000. Machinery of various kinds will be manufactured.

The Niagara Iron, Steel & Metal Co., of Niagara Falls, N. Y., has been incorporated with a capital of $1,000, to deal in iron, steel and other metals.

The Eagle Iron Works Co., Terre Haute, W. Va., has been incorporated with a capital of $30,000, succeeding the Eagle Iron Works, owned by J. A. Parker and son, George W. The company has under consideration plans for extending its business.

The Multi-Vending Machine Co., of Chicago, has been incorporated with a capital of $20,000.

The Glasgow Gas Works & Iron Supply Co., New York, has been incorporated with a capital of $28,000.

The Spokane Iron & Wire Works, Spokane, Wash., has been incorporated with a capital of $10,000. The company is organized on a broad basis to do general manufacturing business, all kinds of ornamental, architectural and structural iron, wire, brass, copper, steel and other metal work, and deal in raw materials entering into the construction of these products.

J. P. Hornaday & Co., 425 Pike Building, Cincinnati, O., and W. J. Gibson, of Norton, Va., have leased 500 acres of coal lands near Pineville, Ky. They will open mines and build coke ovens, installing modern equipments.

The Jamieson-Combe Iron Works, St. Joseph, Mo., is buying a large amount of machine tools to install in the additions recently built.

The Rex Drop Forged Twist Drill Co., Whitestone, N. Y., has been incorporated with a capital of $100,000.

The Seaton Foundry & Mfg. Co., of Kansas City, Mo., has been incorporated with a capital of $50,000.

The New Castle Forge & Bolt Co., New Castle, Pa., has decided to increase the capital stock of the company from $75,000 to $300,000, the increased capital to be used for the improvement of the bolt, rivet and forge departments.

Jarvis & Bro., founders, Huntington, W. Va., have incorporated as the Jarvis Brothers Co., with a capital stock of $10,000.

B. L. Worden and C. J. Allen have organized a company at Milwaukee, Wis., capital $100,000, to engage in the erection of bridges, steel buildings, etc. A large structural fitting shop is to be erected in Milwaukee or the immediate vicinity. Mr. Worden has been the constructing engineer of the Wisconsin Bridge & Iron Co. for several years and resigns on Feb. 1.

The Lawrence Brass Works, of Buffalo, N. Y., has been incorporated with $1,000 capital, to engage in the manu-

facture of brass goods. A. O., A. D., O. R. and L. Lawrence are the incorporators.

The Cleveland Engineering Co., of Cleveland, has been incorporated by Charles H. Benjamin, H. Whitford Jones, H. W. Woodward, Charles A. Caldwell and Clay Herrick. Capital, $10,000. The company will engage in electrical engineering.

Wm. S. D'Arcy and Thos. McGlinchey, of Trenton, N. J., and Thos. J. McKenna, of New York, are the incorporators of the Iron Pipe & Supply Co., of Trenton, N. J., which will manufacture iron pipe and castings. The capital is $100,000.

The National Brass Mfg. Co. has been incorporated at Kansas City, Mo., with a capital of $100,000 to deal in metals and manufacture metal products.

At Cartersville, Ga., F. H. Connor and J. R. Rice, of Tennessee, W. R. Satterfield and W. C. Satterfield have incorporated the Satterfield Mining Co., with capital stock of $15,000, to develop iron mines, etc.

The Southern Automatic Machine Co., Atlanta, Ga., has been incorporated with a capital of $60,000.

New Construction:

The Roe Stephens Mfg. Co., 27th St. and Grand Trunk Railroad, Detroit, is about to erect an iron and a brass foundry for which plans are being prepared by Pollmar & Ropes, 29 State St., Detroit. The iron foundry will be 65x125 feet and the brass foundry 40x125 feet. The iron foundry will be equipped with jib cranes. Both buildings will be of mill construction.

The new plant of the Ferris Clevis Co., Oshkosh, Wis., is fast nearing completion, and will be in partial operation in a few days. The main building is 75x100 feet, and the annealing plant will be 40x75 feet. The equipment for the foundry has been ordered.

The National Enameling & Stamping Co. has obtained an option on a site at New Orleans and as soon as certain switch track privileges are granted, will begin the erection of a quarter of a million dollar plant, which will employ, when completed, 700 men, the majority of them skilled workmen. There seems to be no doubt about the city council granting the desired track privileges.

The Empire Plow Co., Cleveland, has purchased the plant of the Austin-Bryan Mfg. Co., at Ensley, Ala., and will operate it in connection with the Cleveland works. The Ensley plant is a modern one, but will be overhauled and new machinery installed. New buildings will be erected and the total expenditure, including cost of the plant, will be about $200,000. The plows to be made at Ensley are intended for use in the South.

The Drop Forge Co., of Buffalo, has made arrangements to establish a branch at Wayland, N. Y. The site has been donated by the town.

The American Pin Co. of Waterville, Conn., has awarded a contract for the erection of a foundry, brick, one story high, 62x162 feet.

Joseph T. Ryerson & Son, Chicago, iron merchants and special agents, have purchased a plot of ground, 520x300 feet, which is located across the street from their new warehouse for bars, and will be used for the storing of structural material and for the erection of a shop for cutting this material. The equipment will consist of shears, punches and machinery for coping and angling and will be electrically driven.

The construction for the foundry building for the Toledo Castings Co., Toledo, O., has been awarded and work will be started as soon as the weather will permit.

The stockholders of the Warren Steam Pump Co., Warren, Mass., have decided to increase the capital stock to $100,000, to complete the equip the new brick machine shop which is in the progress of erection. The company has declared a semi-annual dividend of 2½ percent.

The Indianapolis Foundry Co., Indianapolis, has added two $10,000 buildings to its plant and increased its working force 20 percent.

Henry B. Lewis, manufacturer of structural steel, Detroit, is building an erecting shop at a cost of $1,500.

E. M. Barr has made extensive additions to his foundry in Champaign, Ill., and expects to build another addition in the spring.

The Rarig Engineering Co., Columbus, O., is erecting a blast furnace at Standish, N. Y., for the Chateaugay Ore & Iron Co.

The plant of the National Steel & Wire Co., at New Haven, Conn., was destroyed by fire Feb. 3, 1901. The removal of the debris was commenced at once, preparatory to rebuilding; plans were prepared for a complete rod and wire mill plant, ground was broken Aug. 1 and construction proceeded rapidly. The rod mill has been in operation four months and a wire drawing plant is now equipped for turning out wire for the company's DeKalb, Ill., plants. Later a Pacific coast plant will be in operation at Oakland, Cal.

The Elliott-Blair Steel Co., Ellwood City, Pa., is considering the removal of its plant to a point near Mahoningtown, just outside of New Castle, Pa. The new plant is to have twice the capacity of the present mill and in addition the site under consideration will afford much better railroad facilities than the present one.

The plant of the Enamel Steel Tile Co., Wheeling, W. Va., which was recently destroyed by fire, is to be rebuilt immediately.

The new plant of the Pittsburg Brass Valve & Fittings Co., in Barberton, O., is rapidly approaching completion. There will be six acres under roof and about 1,500 men will be employed.

The Chase Rolling Mill Co., Waterbury, Conn., has plans prepared for an addition, 90x100 feet.

The Consolidated Horse Shoe Co., of Chicago, will probably build a branch foundry at Waterloo, Iowa.

The Wm. Buck Stove Co., of Brantford, Ontario, which recently purchased the Canada Cycle & Motor Co.'s plant in that city, will add a number of other buildings at a cost of $100,000. The work of construction will commence early in the spring, and will include, utilizing the present structures, the following buildings: Warehouse and shipping department, 60x300 feet, four stories; mill room, 50x100 feet, one story; machine and mounting department, 40x225, three stories; pattern and polishing shop, 40x150 feet, one story; nickel plating and buffing department, 30x70 feet, one story; steel range and sheet department, 40x65 feet, three stories; japanning and finishing department, 25x50 feet, three stories; office sample rooms and stores, 40x150 feet, three stories; moulding shop, 160x275 feet, one story; pattern vault, 40x125 feet, one story. In addition to these there will be a power house of three stories, besides a large cupola attached to the moulding shop.

The Pittsburg District:—

The Pittsburg Structural Steel Co. will receive a Pennsylvania charter on Jan. 12, and will organize with a capital of $200,000 for the purpose of engaging in fitting and erecting structural steel for fireproof structures. A plant with a capacity of 15,000 tons a month will be erected in this district, but the site has not yet been definitely settled upon. From the plans prepared it is estimated that the buildings and yards will occupy about four acres. The main structural shop will be 90x250 feet equipped with electrical power throughout. Among those interested in the venture are C. A. Balph, president of the Columbia Fire Proofing Co.; J. F. Joyce, general superintendent of the same company; George W. Miller, H. B. Shidle and George V. Milliken.

The Carnegie Steel Co., Ltd., has commenced suit against the Jones & Laughlin Steel Co., alleging an infringement of the Jones metal mixer process which was upheld by the courts about a year ago in the equity suit against the Cambria Steel Co. It is probable that other suits will be commenced by the Carnegie Steel Co. against other steel concerns using the mixer in their steel works.

The H. C. Frick Coke Co. has entered into a contract with the Washington Coal & Coke Co. for 500 tons of coal daily to supply the Douglass Coke Works, near West Newton, Pa., where the coal supply has been exhausted. The contract runs throughout 1903.

The Sherwin-Williams Paint Co., of Cleveland, O., has

contracted with the Westinghouse Electric & Mfg. Co. for new electrical power equipment for all its plants. For the Cleveland plant three alternating current generators and inductor meters of 500-h. p. capacity have been ordered, while new electrical machinery will also be placed in the company's plants at Newark, N. J., and Pullman, Ill.

The Pittsburg Coal Co. has purchased the property and holdings of the Midland Coal Co., of Pittsburg, for the sum of $900,000 and the deal provides that a royalty be paid on every ton of coal mined from the property. The company owns 4,700 acres of coal land in the Panhandle field of western Pennsylvania and operates three mines with a daily output of about 3,000 tons.

The Mesta Machine Co. has been making some large shipments of machinery during the past ten days from its plant at West Homestead, Pa. Thirty cars of machinery were started from the plant the last day of 1902 to avoid the increase in freight rates. They were consigned to the Colorado Fuel & Iron Co., Pueblo, Col. This equipment consisted of a universal bar mill, consisting of four stands of rolls, eight sets of tables, hydraulic manipulators and other accessories. In addition the shipment contained large rope wheels and pillow blocks. A cross-compound blowing engine was also shipped to the Joliet, Ill., plant of the Illinois Steel Co., having steam cylinders 44 inches and 84 inches and a 66-inch stroke. The engine weighs about 500 tons and required 25 cars to move it. Two large vertical cross-compound blowing engines were also shipped to the New Castle, Pa., plant of the National Steel Co. this week, requiring 45 cars to carry them.

The Pressed Steel Car Co. has outlined a profit-sharing plan which has been announced to its employes this week. It provides that any of the employes of the company are privileged to subscribe for from one to 25 shares of the preferred stock carrying a dividend of 7 percent at near the market value, a payment of 5 percent being required to secure the stock and the company will carry the same on a basis of 4 percent, the dividends amounting to 3 percent more than the interest asked by the company for carrying the stock. Monthly payments are thereafter to be made on the stock as the purchaser desires until all the stock is paid for.

Charles T. Schoen, the inventor of the pressed steel car, who controls patents for the manufacture of a rolled steel car wheel has decided to locate a plant on a site of 20 acres near the present plant of the Pressed Steel Car Co. at McKees Rocks, Pa. A basic open-hearth steel plant with a daily capacity of 150 tons will be erected, which will enable the finishing department of the plant to complete 300 wheels daily. The Garrett-Cromwell Engineering Co., of Cleveland, O., has been awarded the contract for the engineering work on the new plant. It is also the intention of Mr. Schoen and his associates to erect a plant near Butler, Pa., to provide the plant of the Standard Steel Car Co. with wheels.

Fires and Accidents:—

The foundry of Norris & Lewis, Rock Island, Ill., burned Dec. 30. Loss, $40,000; insurance, $9,000.

The Columbus Bolt Works, Columbus, O., were damaged by fire last week to the extent of $5,000. No insurance.

General Industrial Notes:—

The firm of Hoopes Bros. & Co., Des Moines, Ia., has been changed to Hoopes Bros., they being the sole proprietors of the property, which consists of a modern machine shop.

Andrew Carnegie has notified the provost of Greenock, Scotland, that he is prepared to give $50,000 to erect a memorial to James Watt, in recognition of his engineering achievements, or Mr. Carnegie will head a movement in the United States to raise a large fund which, in conjunction with the sums raised in Great Britain, will provide for a more extensive scheme of commemoration.

The directors of the Eureka Iron & Steel Works, Detroit, have filed a petition asking for a dissolution of the concern. An inventory gives the value of the assets, which are chiefly realty, as $126,979.37, and the present amount of capital stock is $246,436.

Boys employed at coremaking in the foundries of Chicago have declared war upon the practice of engaging girls for the trade, and will ask the iron molders to aid them. The boys declare that the trade is not one in which girls should be engaged. They say that many of them who had been earning $10 a week were displaced by girls at half the wages.

Large engines for British blast furnaces that are being remodeled on American lines will be shipped by the Southwark Foundry & Machine Co., of Philadelphia.

The Acme Fence & Foundry Co., New Albany, Ind., has filed a deed of assignment. The liabilities are about $3,500.

The Strothman Iron Works, Duluth, Minn., are now building the first mining machinery ever turned out of the plant. A large reducing plant is being built for the Black Rock Mining Co.'s plant at Phoenix, Ariz.

The Franklin Steel Works, Boston, manufacturers of standard toe calks, having bought the plant of the Joliet Wire Co., Joliet, Ill., will operate it and also continue operating the Boston plant. Western trade will be supplied from Joliet and eastern from Boston.

The M. Zier Boiler Co., New Albany, Ind., has been placed in the hands of a receiver, on petition of J. T. Ryerson & Son, of Chicago, who sued for $15,000. The liabilities will reach $65,000.

The stockholders of the Ironton Engine Co., recently organized at Ironton, O., have elected J. B. Allfree, president and general manager; Col. H. A. Marting, vice president; D. H. Palmer, secretary and assistant general manager; A. H. Mittendorf, treasurer.

The Phoenix Iron Works, Winona, Minn., have been offered for sale. The plant, which is one of the oldest and largest foundries in Minnesota, was operated for 30 years by the late Wm. M. Hurlburt.

The trouble between the Trenton Malleable Iron Co., Trenton, N. J., and 70 iron molders has been adjusted and the men have returned to work.

The Rising Fawn furnace, which is being built by the Georgia Coal & Iron Co., Chattanooga, Tenn., will be put into blast about Feb. 1.

The Haselton stack of the Republic Iron & Steel Co., at Haselton, O., is to be relined and as soon as this work is completed the furnace will be blown in. The Hannah furnace of this company at Youngstown, O., needs relining badly and as soon as the Haselton stack is in operation the Hannah stack will be blown out.

Four mills of the tin plate plant of the American Tin Plate Co., Middletown, O., were placed in operation this week.

At a meeting of the stockholders of the Sligo Iron & Steel Co., of Connellsville, Pa., held last week directors were elected as follows: Charles Davidson, James M. Reid, Joseph McConnell, E. T. Norton, J. M. Bailey, C. Echard and Joseph Madigan. Charles Davidson was elected president; James M. Reid, vice president; Joseph McConnell, secretary and general manager, and E. T. Norton, treasurer. The company is capitalized at $250,000 and will erect a merchant bar mill together with puddling furnaces. Some of the old mills of the Sligo plant at Pittsburg, which is now being dismantled, have been purchased and have already arrived at Connellsville and will shortly be set up.

No. 1 furnace of the open-hearth plant of the LaBelle Iron Works, Steubenville, O., recently produced 900 tons of steel during a six-day run. Some of the heats produced as high as 70 tons of steel although the furnace is designed to produce only 50 tons. During the week 15 heats were made.

Papers for the formal transfer of the plant of the Standard Seamless Tube Co., of Ellwood City, Pa., to the National Tube Co. were filed at New Castle, Pa., last week. This plant was purchased nearly two years ago but until a few weeks ago all the stock held by the stockholders of the company was not procurable.

E. C. Day has been appointed receiver of the plant of the Pioneer Buckle Co., of Chicago. The liabilities are placed at about $10,000 and the assets at $5,000.

The stove foundry of Wm. Mackey & Sons at South Haven, Mich., is about to be removed to Everett, Wash. The machinery is being packed for shipment.